

FINAL REPORT NUMBER 201U-MGA-05-01

SAFETY COMPLIANCE TESTING FOR FMVSS 201U
Occupant Protection In Interior Impact
Upper Interior Head Impact Protection

DAIMLERCHRYSLER CORPORATION (CANADA)
2005 Dodge Magnum 4-Door Wagon
NHTSA No. C50302

MGA RESEARCH CORPORATION
446 Executive Drive
Troy, Michigan 48083



Test Dates: November 16-17, 2004
Report Date: November 18, 2004

FINAL REPORT

PREPARED FOR:

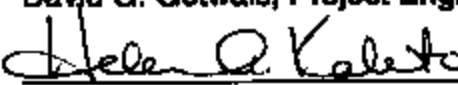
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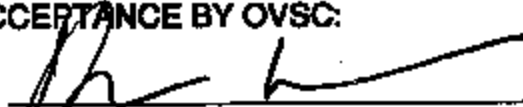


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16. Abstract A compliance test series was conducted on the subject 2005 Dodge Magnum 4-Door Wagon, NHTSA No. C50302, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-201U-01 for the determination of FMVSS 201U compliance. The testing was conducted at MGA Research Corporation in Troy, Michigan on November 16-17, 2004. Test failures identified were as follows: <p align="center">None</p> The data recorded seems to indicate that the 2005 Dodge Magnum 4-Door Wagon tested appears to comply with the requirements for FMVSS 201U which were set forth by the National Highway Traffic Safety Administration.					
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this head impact compliance test was to determine whether the subject vehicle, a 2005 Dodge Magnum 4-Door Wagon, meets the performance requirements of FMVSS 201U, Occupant Protection in Interior Impact - Upper Interior Head Impact Protection.

Tests were conducted during November 16-17, 2004 on a 2005 Dodge Magnum 4-Door Wagon, manufactured by DaimlerChrysler Corporation (Canada).

All tests were conducted in accordance with the U. S. Department of Transportation, National Highway Traffic Safety Administration's Laboratory Test Procedure TP-201U-01 dated April 3, 1998 and the corresponding MGA Research Corporation's FMVSS 201U procedure number MGATP201U_FRAME#2 dated March 20, 2003.

All tests were conducted at MGA Research Corporation in Troy, Michigan and were performed by MGA engineers and technicians. The FMVSS 201U impactor test machine was used to conduct the testing. Target locations were determined by using a Coordinate Measurement Machine in conjunction with the MGA EZ-Target™ program and MGA procedure MGATP201U_Test Series dated March 20, 2003.

2.0 COMPLIANCE TEST DATA SUMMARY

The 2005 Dodge Magnum 4-Door Wagon was equipped with A, B, C, and Rear-pillars, grab handles above each rear passenger door, an adjustable seat belt anchorage on each B-pillar, and a utility console on the front, center upper roof.

Upon completion of targeting the test vehicle, twelve (12) targets were chosen to be impacted based upon engineering judgment and certification test data provided by DaimlerChrysler Corporation. Targets were chosen which appeared most likely to give high HIC(d) values. The twelve (12) targets chosen were:

AP1	BP1	OP2	UR1
AP2	BP2	SR3-1	UR2
AP3	FH1	SR2(B)	UR7

The 2005 Dodge Magnum 4-Door Wagon tested appears to comply with the performance criteria for FMVSS 201U. The HIC(d) measured using the Part 572L (Free Motion Headform) was below 1000 for each tested component.

TABLE 2-1
SUMMARY TABLE OF TEST RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2005 Dodge Magnum 4-Door Wagon

VEH. NHTSA NO.: C50302 VIN: 2D4FV48T55H513493 COLOR: Cool Vanilla

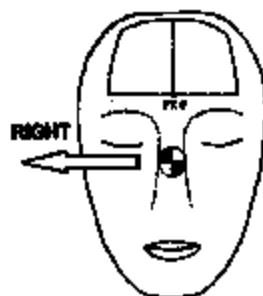
VEH. BUILD DATE: August, 2004 TEST DATES: November 16-17, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

TARGET	VEHICLE SIDE	HORIZONTAL ANGLE (deg)	VERTICAL ANGLE (deg)	VELOCITY (kph)	HIC(d)	FMH HIC	IMPACT ON FMH (mm)	
							Above	Left/Right
AP1	Right	159	50	23.2	809	851	20	3 Right
AP2	Left	202	46	23.3	785	819	13	9 Right
AP3	Right	159	41	23.9	742	763	15	0
BP1	Left	270	14	24.0	458	387	33	10 Left
BP2	Left	270	15	23.9	678	679	18	3 Left
FH1	Right	180	50	24.0	522	471	34	0
OP2	Right	90	5	23.3	801	576	23	7 Left
SR2(B)	Right	90	30	24.2	543	499	15	3 Left
SR3-1	Left	270	32	23.5	461	391	20	2 Left
UR1	Left	270	34	23.9	419	335	50	7 Left
UR2	Right	90	25	23.9	525	475	82	0
UR7	Right	33	50	23.9	650	641	18	13 Left

Above and left/right refers to the position relative to reference pt. 0 where the target made contact with the Free Motion Headform. See the diagram below for details.



POST TEST COMMENTS:

The following description lists any post-test damage or other test observations for each target.

BP1 Left: Headliner displacement.

UR2 Right: Headliner displacement.

REMARKS:

The targets listed were impacted in the following order:

Right: AP3, AP1, UR2, SR2(B), FH1, OP2, UR7

Left: AP2, UR1, BP2, BP1, SR3-1

The 150 mm rule was observed for targets horizontal to each other and the 200 mm rule was observed for vertical components.

RECORDED BY: David G. Gotwals

DATE: November 17, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-2
GENERAL TEST AND VEHICLE PARAMETER DATA

VEH. MOD YR/MAKE/MODEL/BODY: 2005 Dodge Magnum 4-Door Wagon

VEH. NHTSA NO.: C50302 VIN: 2D4FV48T55H513493 COLOR: Cool Vanilla

VEH. BUILD DATE: August, 2004 TEST DATES: November 16-17, 2004

TEST LABORATORY: MGA Research Corporation

OBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

INTERIOR TRIM INFORMATION: A, B, C, and Rear-pillars, grab handles above each rear passenger door, an adjustable seat belt anchorage on each B-pillar, and a utility console on the front, center upper roof.

SUNROOF INFORMATION:

Installed: Yes X No
Operation: Electric Manual

ROLL-BAR INFORMATION:

Installed: Yes X No
Padded: Yes X No
Braces: Yes X No

GENERAL INFORMATION:

Date Received: November 12, 2004; Odometer Reading 15 miles

DATA FROM VEHICLE'S CERTIFICATION LABEL:

Vehicle Manufactured By: DaimlerChrysler Corporation (Canada)

Date of Manufacture: August, 2004; VIN: 2D4FV48T55H513493

GVWR: 2225 kg; GAWR FRONT: 1256 kg;

GAWR REAR: 1266 kg

DATA FROM TIRE PLACARD:

Tire Pressure with Maximum Capacity Vehicle Load:

FRONT: 210 kpa REAR: 210 kpaRecommended Tire Size: P215/65R17 Load Range: 750 kg

Recommended Cold Tire Pressure:

FRONT: 210 kpa REAR: 210 kpaSize of Tire on Test Vehicle: P215/65R17Type of Spare Tire: T135/90D17 Saver X; Standard

VEHICLE CAPACITY DATA:

Type of Front Seats: Bench ; Bucket X; Split Bench Number of Occupants: Front 2; Rear 3; TOTAL 5VEHICLE CAPACITY WEIGHT (VCW) = 392 kgNo. of Occupants x 68 kg = 340 kgRated Cargo/Luggage Weight (RCLW) = 52 kg (difference)

WEIGHT OF TEST VEHICLE AS DELIVERED AT LABORATORY: (with maximum fluids)

Right Front = 437.5 kg Right Rear = 430.5 kgLeft Front = 448.5 kg Left Rear = 419.5 kgTOTAL FRONT = 886.0 kg TOTAL REAR = 850.0 kg% Total Weight = 51.0 % % Total Weight = 49.0 %TOTAL DELIVERED WEIGHT = 1736.0 kg

CALCULATION OF VEHICLE'S TARGET TEST WEIGHT:

Total Delivered Weight = 1736.0 kgRated Cargo/Luggage Weight = 52.0 kgTarget Test Weight = 1788.0 kg

WEIGHT OF TEST VEHICLE FULLY LOADED:

Right Front =	<u>437.0</u> kg	Right Rear =	<u>455.0</u> kg
Left Front =	<u>448.5</u> kg	Left Rear =	<u>444.5</u> kg
TOTAL FRONT =	<u>885.5</u> kg	TOTAL REAR =	<u>899.5</u> kg
% Total Weight =	<u>49.6</u> %	% Total Weight =	<u>50.4</u> %
TOTAL TEST WEIGHT = <u>1785.0</u> kg			
Weight of ballast secured in vehicle's cargo area = <u>49.0</u> kg			

TEST VEHICLE ATTITUDE:

AS DELIVERED: Right Front 794.0 mm; Left Front 793.0 mm;
 Right Rear 784.0 mm; Left Rear 786.0 mm;
 Pitch Angle at Right Door Sill = -0.1 Front higher
 Pitch Angle at Left Door Sill = 0.4 Front higher
 Roll Angle at Front Bumper = -0.1 Right higher
 Roll Angle at Rear Bumper = -0.1 Right higher

FULLY LOADED: Right Front 794.0 mm; Left Front 796.0 mm;
 Right Rear 777.0 mm; Left Rear 780.0 mm;
 Pitch Angle at Right Door Sill = 0.0
 Pitch Angle at Left Door Sill = 0.2 Front higher
 Roll Angle at Front Bumper = 0.0
 Roll Angle at Rear Bumper = 0.0

AS TARGETED: Right Front 974.0 mm; Left Front 977.0 mm;
 Right Rear 971.0 mm; Left Rear 972.0 mm;
 Pitch Angle at Right Door Sill = -0.1 Front higher
 Pitch Angle at Left Door Sill = 0.4 Front higher
 Roll Angle at Front Bumper = -0.1 Right higher
 Roll Angle at Rear Bumper = 0.0

AS TESTED ON RIGHT SIDE:

Pitch Angle at Right Door Sill = -0.1 Front higher
 Pitch Angle at Left Door Sill = 0.4 Front higher
 Roll Angle at Front Bumper = -0.1 Right higher
 Roll Angle at Rear Bumper = 0.0

AS TESTED ON LEFT SIDE:

Pitch Angle at Right Door Sill = -0.1 Front higher
Pitch Angle at Left Door Sill = 0.4 Front higher
Roll Angle at Front Bumper = -0.1 Right higher
Roll Angle at Rear Bumper = 0.0

VEHICLE WHEELBASE = 3060 mm

REMARKS: The seat travel distance was measured to be 270 mm for the driver front seat and 222 mm for the passenger front seat.

RECORDED BY: David G. Gotwals

DATE: November 13, 2004

APPROVED BY: Helen A. Kaleta

TABLE 2-3

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

VEH. MOD YR/MAKE/MODEL/BODY: 2005 Dodge Magnum 4-Door WagonVEH. NHTSA NO.: C50302 VIN: 2D4FV48T55H513493 COLOR: Cool VanillaVEH. BUILD DATE: August 2004 TEST DATES: November 16-17, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

HORIZONTAL IMPACT ANGLE RANGE FOR A AND B PILLARS

	HORIZONTAL ANGLE SPECIFIED RANGE	MINIMUM HORIZONTAL ANGLE	MAXIMUM HORIZONTAL ANGLE
A-PILLAR	L 195°-255°	L 201.2°	L 248.8°
	R 105°-165°	R 112.8°	R 159.3°
B-PILLAR	L 195°-345°	L 199.1°	L 290.8°
	R 15°-165°	R 70.2°	R 161.0°

S DETERMINED USING THE PROCEDURES SPECIFIED IN S8.13.4.1

REMARKS:

RECORDED BY: David G. GotwalsDATE: November 13, 2004APPROVED BY: Helen A. Kaleta

TABLE 2-4

VERTICAL IMPACT ANGLE RANGES

VEH. MOD YR/MAKE/MODEL/BODY: 2005 Dodge Magnum 4-Door WagonVEH. NHTSA NO.: C50302 VIN: 2D4FV48T55H513493 COLOR: Cool VanillaVEH. BUILD DATE: August, 2004 TEST DATES: November 16-17, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

VERTICAL IMPACT ANGLE RANGES

		VERTICAL ANGLE SPECIFIED RANGE		MINIMUM VERTICAL ANGLE	MAXIMUM VERTICAL ANGLE
FRONT HEADER	FH1	L	0°-50°	L 0°	L 50°
		R	0°-50°	R 0°	R 50°
	FH2	L	0°-50°	L 0°	L 50°
		R	0°-50°	R 0°	R 50°
SIDE RAIL	SR1	L	0°-50°	L 0°	L 30°
		R	0°-50°	R 0°	R 30°
	SR2A	L	0°-50°	L 0°	L 28°
		R	0°-50°	R 0°	R 30°
	SR2B	L	0°-50°	L 0°	L 29°
		R	0°-50°	R 0°	R 30°
	SR3-1	L	0°-50°	L 0°	L 32°
		R	0°-50°	R 0°	R 37°
	SR3-2	L	0°-50°	L 0°	L 32°
		R	0°-50°	R 0°	R 37°
	SR3-3	L	0°-50°	L 0°	L 23°
		R	0°-50°	R 0°	R 25°
REAR HEADER	RH	L	0°-50°	L 0°	L 50°
		R	0°-50°	R 0°	R 50°
A-PILLAR	AP1	L	-5°-50°	L -5°	L 49°
		R	-5°-50°	R -5°	R 50°

		VERTICAL ANGLE SPECIFIED RANGE		MINIMUM VERTICAL ANGLE		MAXIMUM VERTICAL ANGLE	
	AP2	L	-5°-50°	L	-5°	L	46°
		R	-5°-50°	R	-5°	R	45
	AP3	L	-5°-50°	L	-5°	L	42°
		R	-5°-50°	R	-5°	R	41°
B-PILLAR	BP1	L	-10°-50°	L	-10°	L	14°
		R	-10°-50°	R	-10°	R	14°
	BP2*	L	0°-50°	L	0°	L	15°
		R	0°-50°	R	0°	R	16°
	BP3	L	-10°-50°	L	-10°	L	5°
		R	-10°-50°	R	-10°	R	2°
	BP4	L	-10°-50°	L	-10°	L	-4°
		R	-10°-50°	R	-10°	R	-6°
OTHER PILLAR	OP1	L	-10°-50°	L	-10°	L	17°
		R	-10°-50°	R	-10°	R	17°
	OP2	L	-10°-50°	L	-10°	L	5°
		R	-10°-50°	R	-10°	R	5°
REAR PILLAR	RP1	L	-10°-50°	L	-10°	L	44°
		R	-10°-50°	R	-10°	R	45°
UPPER ROOF 1		0°-50°		0°		34°	
UPPER ROOF 2		0°-50°		0°		25°	
UPPER ROOF 3		0°-50°		0°		31°	
UPPER ROOF 4		0°-50°		0°		41°	
UPPER ROOF 5		0°-50°		0°		30°	
UPPER ROOF 6		0°-50°		0°		28°	
UPPER ROOF 7		0°-50°		0°		50°	

As determined using the Procedures specified in S8.13.4.2. *Target BP2 is a seat belt anchorage location.

RECORDED BY: David G. Gotwals

DATE: November 13, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-5

TARGET MEASUREMENTS

VEH. MOD YR/MAKE/MODEL/BODY: 2005 Dodge Magnum 4-Door WagonVEH. NHTSA NO.: C50302 VIN: 2D4FV48T55H513493 COLOR: Cool VanillaVEH. BUILD DATE: August, 2004 TEST DATES: November 16-17, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

Measurement	Description	Left Side	Right Side
M	Seat Fore/Aft Travel (Front seats)	270.0 mm	222.0 mm
T°	Horizontal < (CG-F1 (Left Seat) to (Right A-Pillar))	111.2°	--
A1°	360° - T°	248.8°	--
W°	Horizontal < (CG-2 (Left Seat) to (Left A-Pillar))	201.2°	--
A2°	A2° = W°	201.2°	--
U°	Horizontal < (CG-2 (Left Seat) to (Left B-Pillar))	290.8°	--
B1°	B1° = U°	290.8°	--
V°	Horizontal < (CG-R (Left Seat) to (Left B-Pillar))	199.1°	--
B2°	B2° = V°	199.1°	--
W° (right)	Horizontal < (CG-F2 (Right Seat) to (Right A-Pillar))	--	159.3°
A1° (right)	A1° (right) = W° (right)	--	159.3°
T° (right)	Horizontal < (CG-F1 (Right Seat) to (Left A-Pillar))	--	247.2°
A2° (right)	360° - T° (right)	--	112.8°
V° (right)	Horizontal < (CG-R (Right Seat) to (Right B-Pillar))	--	161.0°
B1° (right)	B1° (right) = V° (right)	--	161.0°
U° (right)	Horizontal < (CG-F2 (Right Seat) to (Right B-Pillar))	--	70.2°
B2° (right)	B2° (right) = U° (right)	--	70.2°
J	A-Pillar ((Plane 3) - (Plane 5))	310.1 mm	309.9 mm
J/2	J ÷ 2	155.1 mm	155.0 mm
D1	Upper Roof ((Plane A) - (Plane B))	2150.0 mm	
D1/2	D1 ÷ 2	1075.0 mm	
D2	Upper Roof ((Plane C) - (Plane D))	1267.4 mm	
D2/2	D2 ÷ 2	633.7 mm	
.35D1	.35 x D1	752.5 mm	
.35D2	.35 x D2	443.6 mm	

Measurement	Description	Left Side	Right Side
N	B-Pillar ((BPR) - (lowest point on daylight opening forward of B-Pillar))	370.3 mm	367.4 mm
N/2	B-Pillar ((BP3) - (lowest point on daylight opening forward of B-Pillar))	185.2 mm	183.7 mm
N/4	B-Pillar ((BP4) - (lowest point on daylight opening forward of B-Pillar))	92.6 mm	91.9 mm
Q	O-Pillar (Plane 13 – Plane 14)	326.6 mm	324.8 mm
Q/2	Q / 2	164.3 mm	162.4 mm
D	R-Pillar (Point 7 – Point M)	880.0 mm	880.0 mm
3 D/7	3 * D / 7	377.1 mm	377.1 mm

As determined using the Procedures specified in S10.1-10.13.

SgRP Locations (vehicle coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1839.8	-380.0	709.0	1839.8	380.0	709.0
Rear Row	2740.8	-380.0	700.0	2740.8	380.0	700.0

SgRP Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
Front	1842.1	-381.2	707.8	1841.9	380.1	706.9
Rear Row	2745.8	-382.7	697.7	2745.6	378.6	696.8

CG Locations (world coordinates)						
	Left (mm)			Right (mm)		
	x	y	z	x	y	z
CGF1	1732.1	-381.2	1367.8	1779.9	380.1	1366.9
CGF2	2002.1	-381.2	1367.8	2001.9	380.1	1366.9
CGR	2905.8	-382.7	1357.7	2905.6	378.6	1356.8

REFERENCE FOR VEHICLE COORDINATE SYSTEM:

Left top door striker bolt (center) (x, y, z) = 1978.0, -828.0, 850.0

Left forward-most inboard seat anchor bolt hole (x, y, z) = 1535.0, -176.0, 487.0

Right top door striker bolt (center) (x, y, z) = 1978.0, 828.0, 855.0

REMARKS:

RECORDED BY: David G. Gotwals

DATE: November 13, 2004

APPROVED BY: Helen A. Kaleto

TABLE 2-6

SUMMARY OF TARGETING RESULTS

VEH. MOD YR/MAKE/MODEL/BODY: 2005 Dodge Magnum 4-Door WagonVEH. NHTSA NO.: C50302 VIN: 2D4FV48T55H513493 COLOR: Cool VanillaVEH. BUILD DATE: August, 2004 TEST DATES: November 16-17, 2004TEST LABORATORY: MGA Research CorporationOBSERVERS: David Gotwals, Nicholas Brzuch, Bryan Hood

SUMMARY OF TARGETING RESULTS								
Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
A-Pillar Left Side								
AP1	1487.8	-558.5	1472.3	--	--	Yes	--	--
REL	1502.3	-586.5	1435.3	202	49	--	2	No
AP2	1403.8	-614.6	1386.1	202	46	No	--	Yes
AP3	1293.2	-647.6	1318.2	202	42	No	--	No
A-Pillar Right Side								
AP1	1488.3	554.0	1474.0	--	--	Yes	--	--
REL	1502.3	586.5	1435.3	159	50	--	2	Yes
AP2	1397.5	606.2	1386.8	159	45	No	--	No
AP3	1289.6	644.1	1319.7	159	41	No	--	Yes
B-Pillar Left Side								
BP1	2150.5	-501.0	1533.5	270	14	No	--	Yes
BP2	2109.6	-611.8	1285.2	270	15	No	--	Yes
BP3	2088.7	-620.4	1349.1	--	--	Yes	--	--
REL	2086.2	-631.0	1322.5	290	6	--	1	No
BP4	2158.2	-669.9	1257.7	220	-4	No	--	No
B-Pillar Right Side								
BP1	2143.4	499.4	1535.0	90	14	No	--	No
BP2	2115.4	605.4	1289.8	90	16	No	--	No
BP3	2084.4	616.8	1351.9	--	--	Yes	--	--
REL	2059.3	627.4	1320.8	70	2	--	1	No
BP4	2157.5	668.9	1261.1	160	-6	No	--	No

SUMMARY OF TARGETING RESULTS

Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
Other Pillar Left Side								
OPR	2821.6	-493.1	1528.8	-	-	-	--	-
OP1	2821.6	-493.1	1528.8	270	17	No	--	No
OP2	2950.3	-625.5	1364.7	-	-	Yes	--	--
REL	2930.3	-625.5	1364.7	270	5	-	1	No
Other Pillar Right Side								
OPR	2821.9	494.7	1531.3	--	--	--	-	-
OP1	2821.9	494.7	1531.3	90	17	No	-	No
OP2	2952.9	631.8	1366.0	-	-	Yes	--	-
REL	2932.9	631.8	1366.0	90	5	--	1	Yes
Rear Pillar Left Side								
RP1	3195.6	-624.3	1437.3	315	44	No	-	No
RP2	3665.3	-699.4	1267.1	Target exempt from testing.				No
Rear Pillar Right Side								
RP1	3192.6	627.7	1437.3	45	45	No	--	No
RP2	3672.2	597.7	1267.7	Target exempt from testing.				-
Front Header Left Side								
FH1	1367.2	-442.0	1484.5	180	50	No	-	No
FH2	1326.4	-296.0	1493.4	180	50	No	-	No
Front Header Right Side								
FH1	1366.9	438.8	1488.6	180	50	No	-	Yes
FH2	1327.3	294.4	1495.5	180	50	No	-	No
Side Rail Left Side								
SR1	1637.2	-512.9	1506.6	270	30	No	-	No
SR2A	1788.5	-521.1	1503.1	270	28	No	--	No
SR2B	1850.0	-521.2	1507.6	270	29	No	-	No
SR3-1	2629.8	-509.0	1479.5	270	32	No	-	Yes
SR3-2	2674.3	-514.6	1466.6	270	32	No	-	No
SR3-3	2972.3	-497.2	1507.4	270	23	No	-	No
Side Rail Right Side								
SR1	1636.1	512.9	1506.0	90	30	No	-	No
SR2A	1785.9	518.9	1503.0	90	30	No	-	No

SUMMARY OF TARGETING RESULTS

Target	Location (mm)			Horizontal Angle (deg)	Vertical Angle (deg)	Relocation (Yes/No)	Extension (# of 25 mm Spheres)	Impact (Yes/No)
	x	y	z					
SR2B	1842.7	518.1	1506.8	90	30	No	--	Yes
SR3-1	2527.7	505.6	1481.9	90	37	No	--	No
SR3-2	2672.9	510.0	1470.3	90	37	No	--	No
SR3-3	2971.5	498.1	1513.7	90	25	No	--	No
Rear Header Left Side								
RH	3199.5	-382.3	1496.7	0	50	No	--	No
Rear Header Right Side								
RH	3175.1	379.1	1498.4	0	50	No	--	No
Upper Roof Left Side								
UR1	1778.7	-438.8	1519.9	270	34	No	--	Yes
UR2	2140.6	-437.6	1540.8	270	25	No	--	Yes
UR3	2961.4	-439.2	1529.2	270	31	No	--	No
Upper Roof Right Side								
UR4	1626.3	436.8	1484.6	90	41	No	--	No
UR5	1831.8	437.0	1525.1	90	30	No	--	No
UR6	2827.5	442.0	1543.3	90	28	No	--	No
UR7	3055.6	443.6	1529.2	33	50	No	--	Yes

As determined using the Procedures specified in S10.1-10.13.

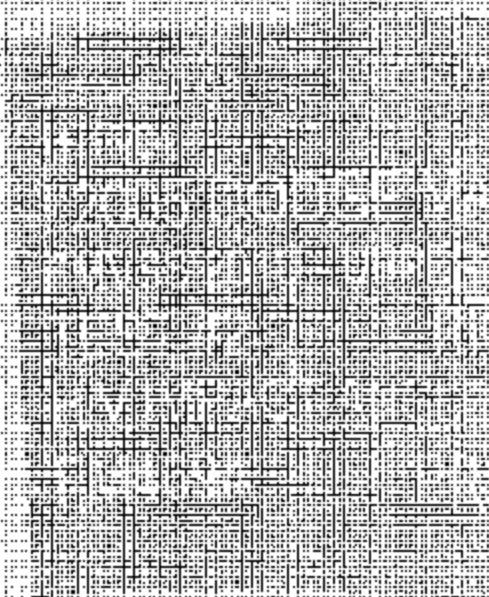
REMARKS: Target RP2 on each side was found to be greater than 600 mm rearward of the rearmost SgRP and therefore exempt from testing, per S6.3(b).

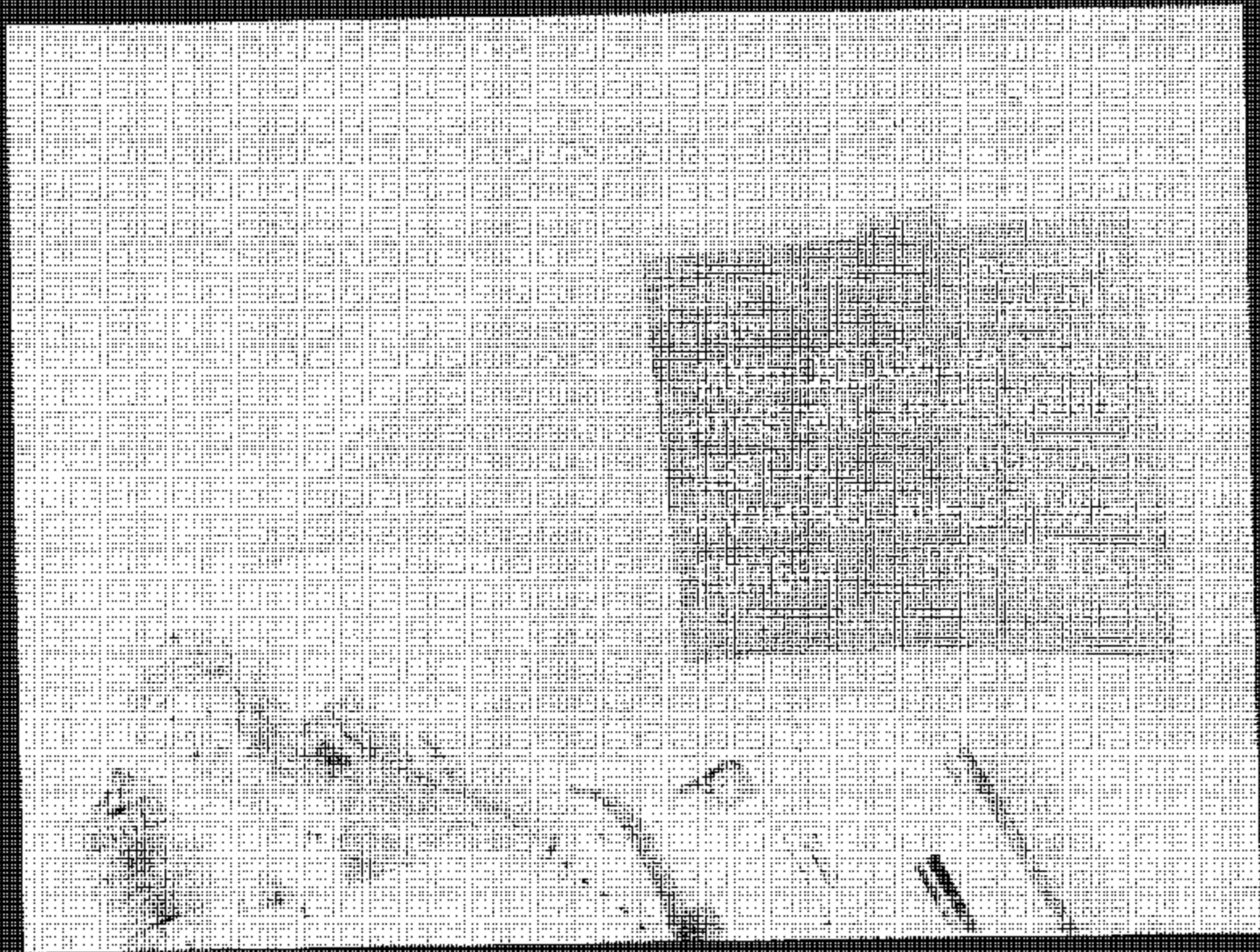
Target UR2 was located on the left side of the vehicle for the targeting procedure as entered in the above table. The target was moved to the right side of the vehicle for testing because of the minimum distance between targets restriction. The horizontal approach angle was changed to 90°.

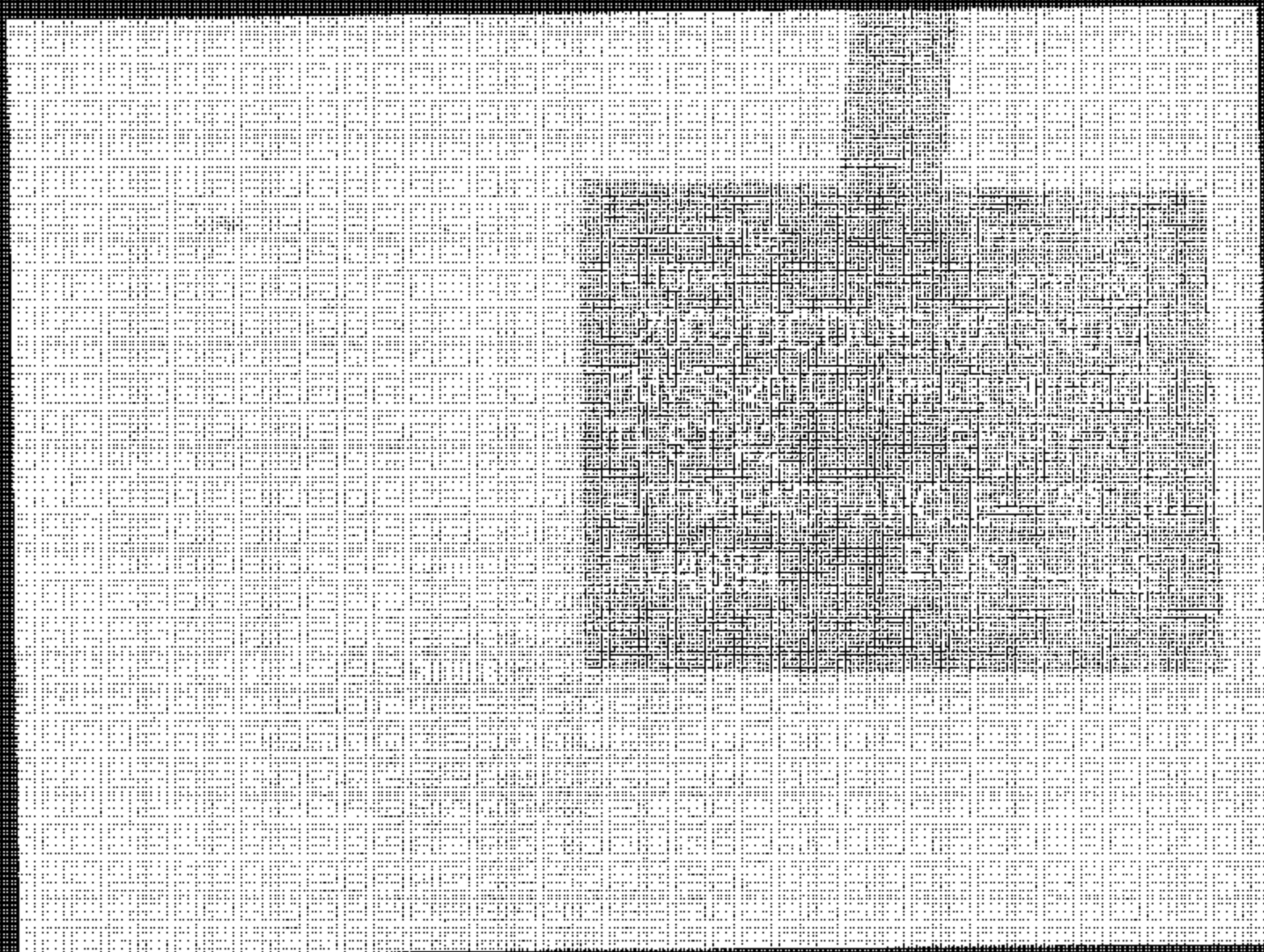
RECORDED BY: David G. Gotwals

DATE: November 13, 2004

APPROVED BY: Helen A. Kaleto







MICHIGAN OPERATIONS
DATE: 2/8/01
SUPERCEDES: MGATP207210.2

DOC. NO.: MGATP207210.3
REVISION NO.: 2
PAGE 1 OF 1

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): AP1 Right

MGA Test Reference No.: FM4694

Approach Horizontal Angles: 159°

Approach Vertical Angles: 50°

Additional Description:

Test Number: #2

Temperature: 24C

Humidity: 30%

Time of Test: 12:30 PM

FMH Serial No: 036

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
808	851	6	23.2	20	3 R

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-99.8	1.47	1.47
Y	6	J35916	99.7	1.54	1.54
Z	7	J35918	98.1	1.48	1.48

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By: [Signature] Date: 11/16/04

*Only necessary for NHTSA (Government) Compliance testing.

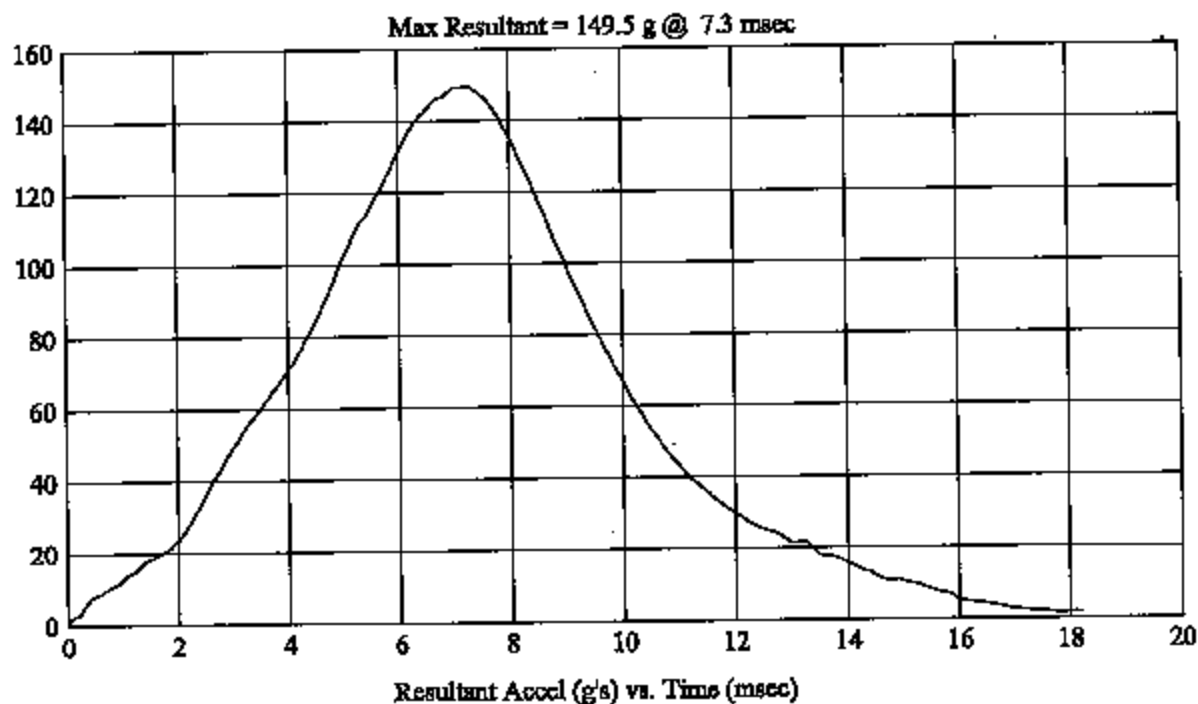
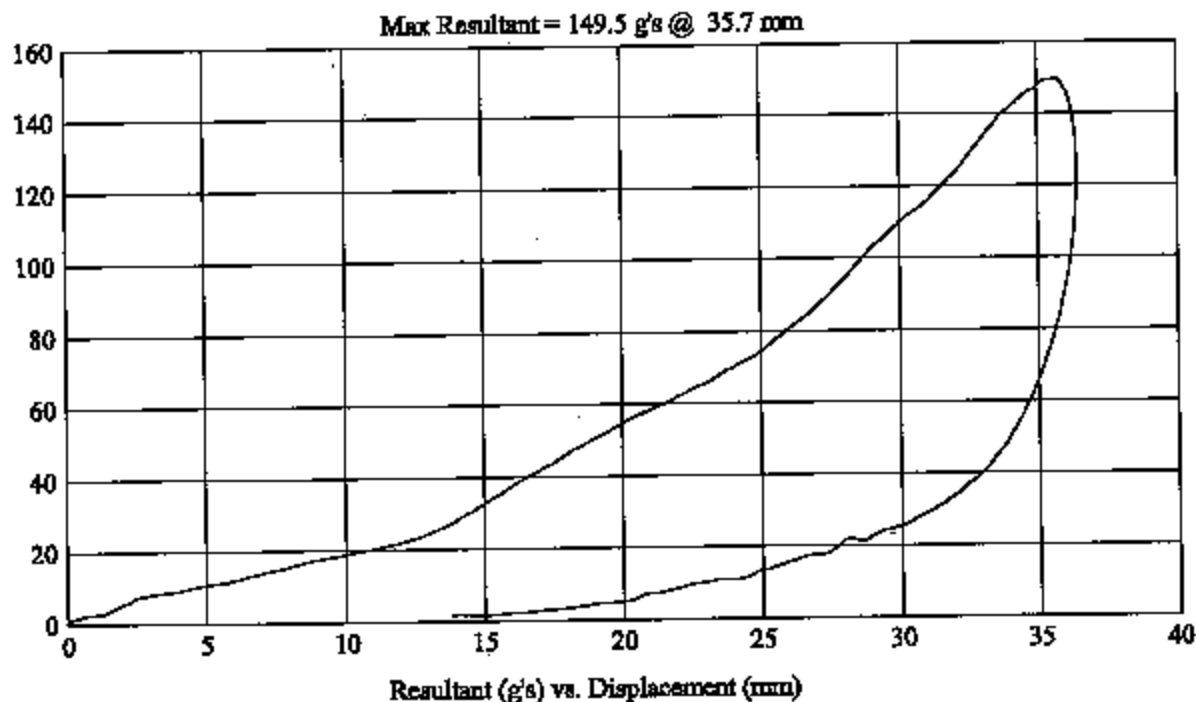
FMH
G05I7-001.1Customer: DODGE
Test # 2
FM4694
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP1
Vehicle Side: Right
Horiz/Vert Angle: 159/50

HIC(d) = 808, HIC = 851, Delta T = 6 msec



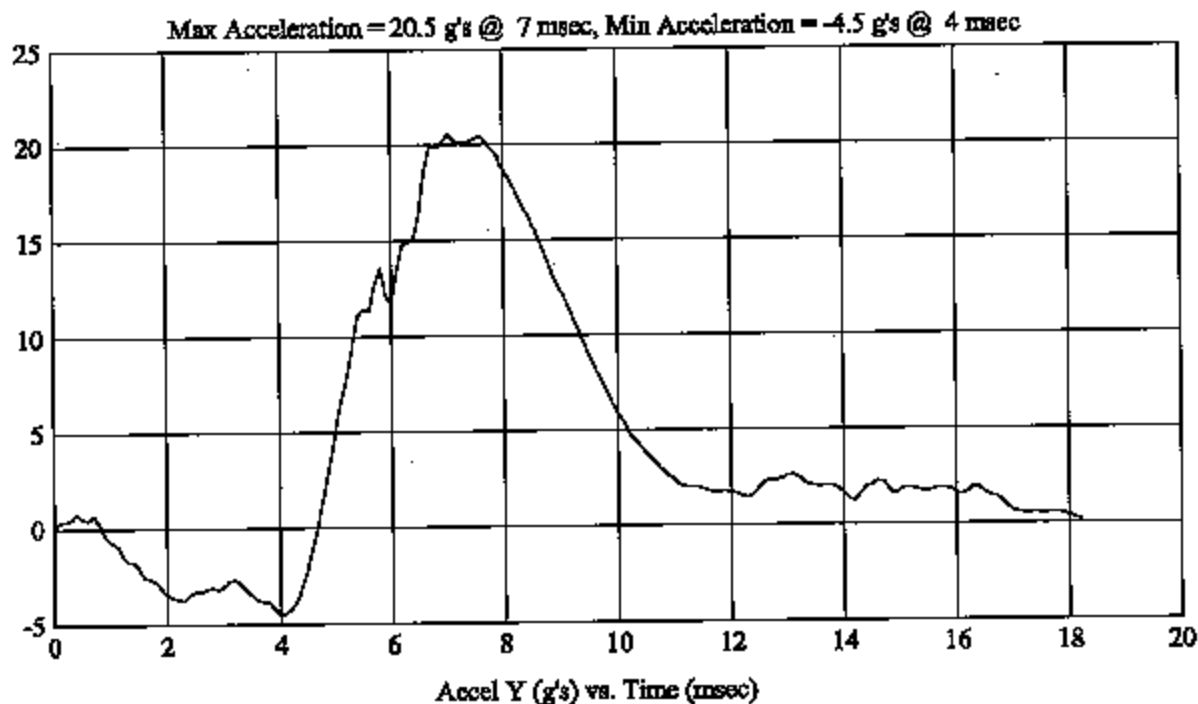
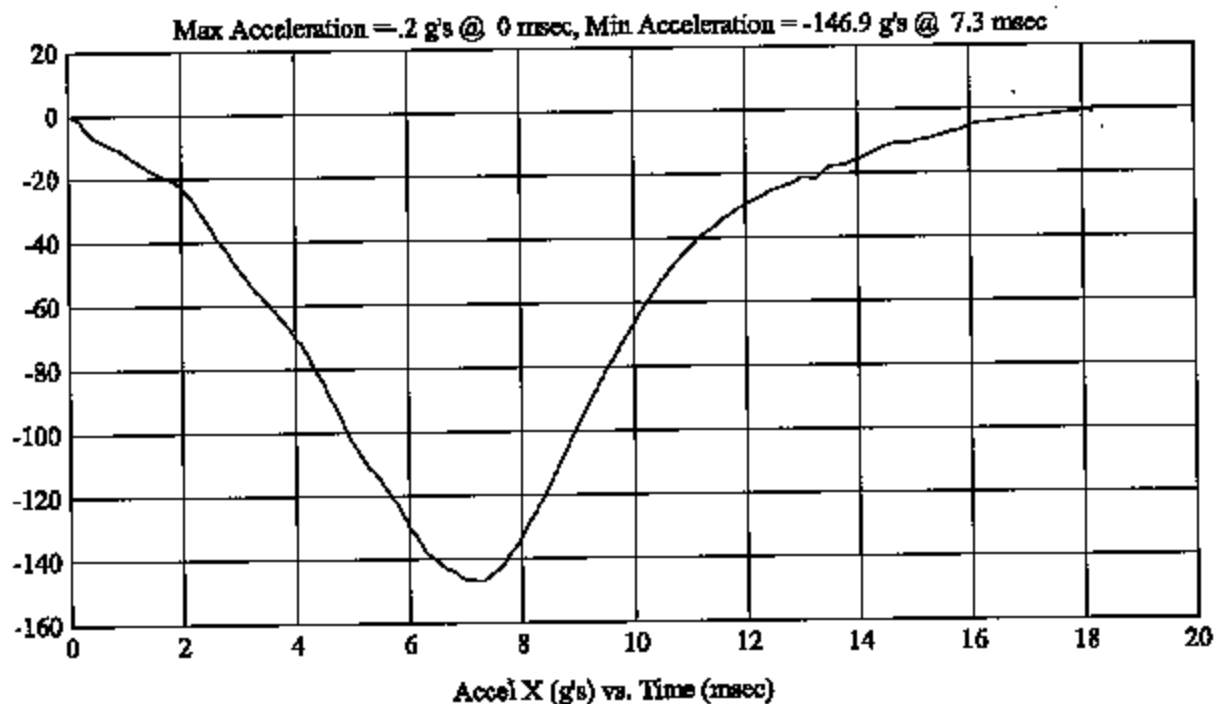
Customer: DODGE
Test # 2
FM4694
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 159/50

HIC(d) = 808, HIC = 851, Delta T = 6 msec



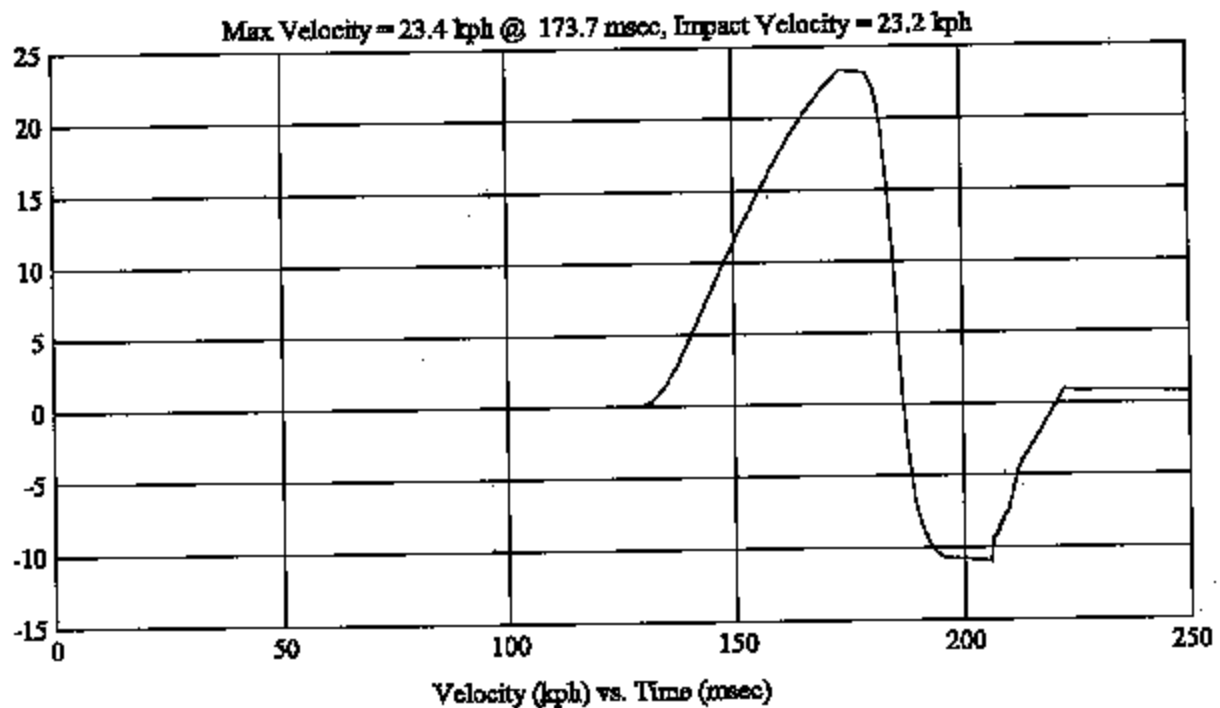
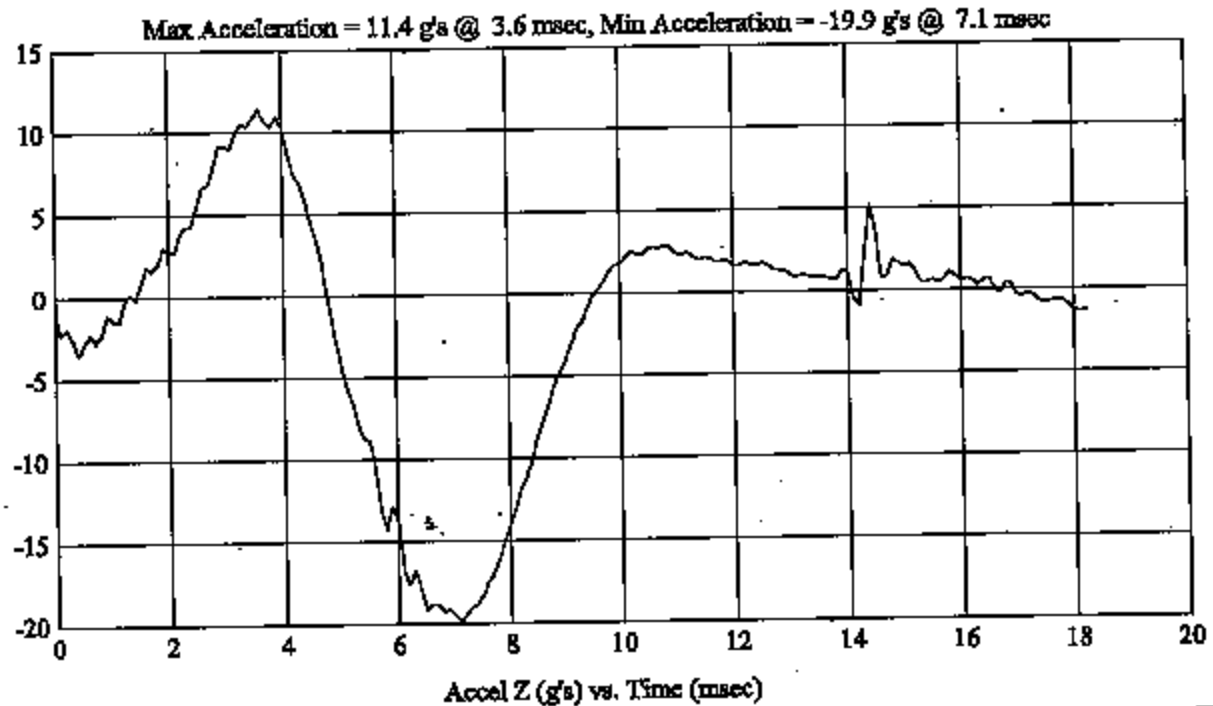
Customer: DODGE
Test # 2
FM4694
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 159/50

HIC(d) = 808, HIC = 851, Delta T = 6 msec



FMH
G05X7-001.1

3-8

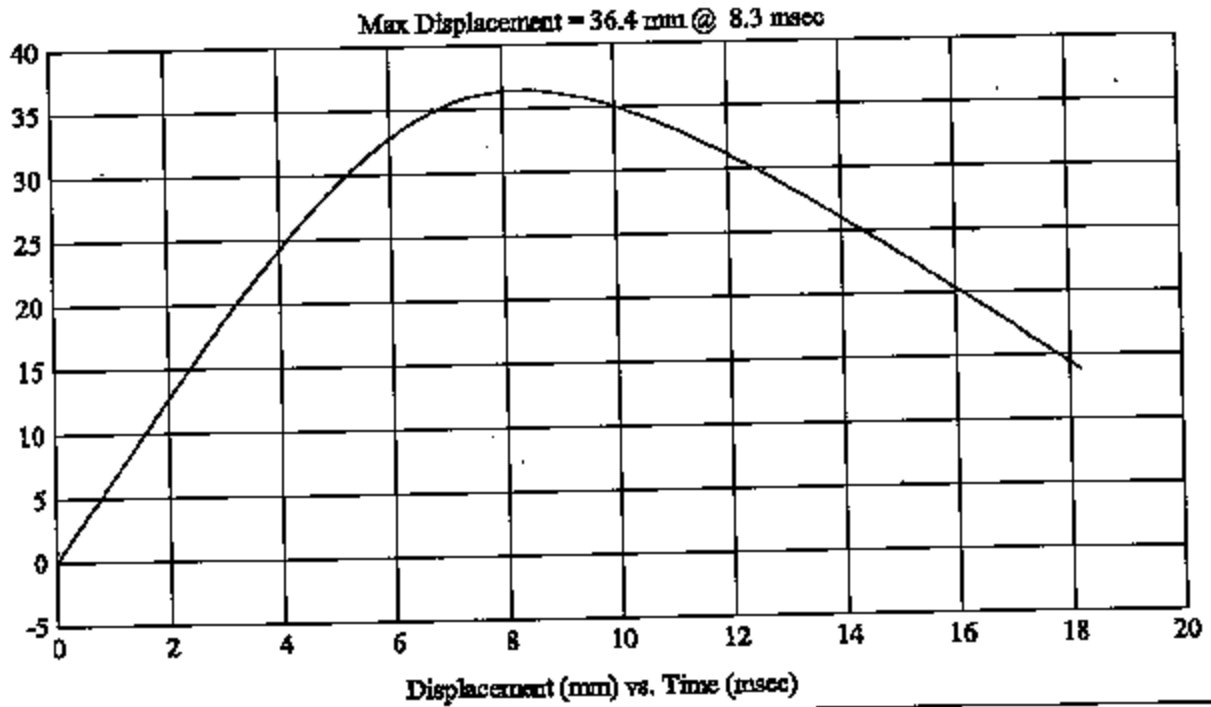
Customer: DODGE
Test # 2
FM4694
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP1
Vehicle Side: Right
Horz/Vert Angle: 159/50

HIC(a) = 808, HIC = 851, Delta T = 6 msec



FBI LABORATORY

Impact Testing

7/17/00

G0057-001.1

2005 DODGE MAGNUM

FMVSS 2010 - UPPER INTERIOR

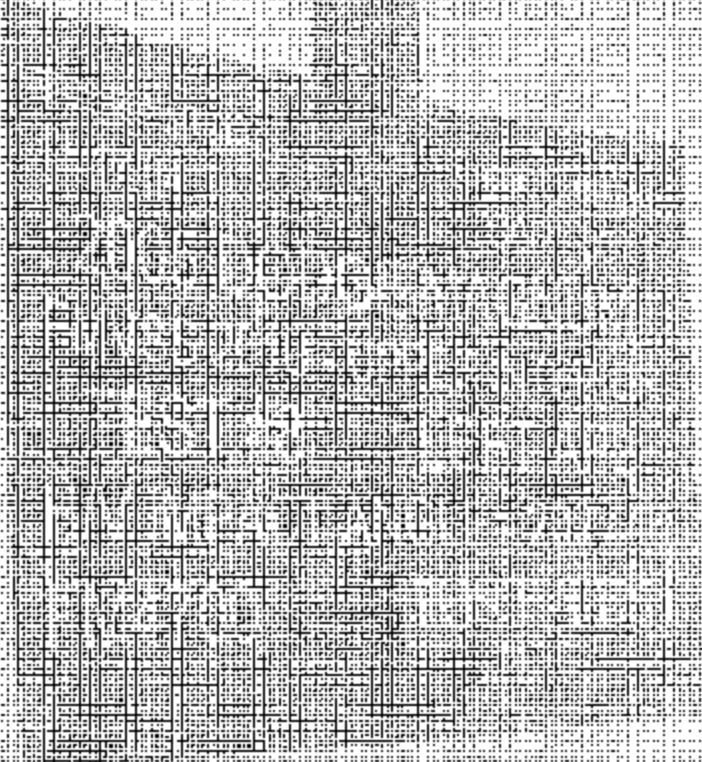
TEST #8

LEFT AP2

HV IMPACT ANGLE= 202 / 45

FM4700

PRE-TEST



MICHIGAN OPERATIONS
DATE: 2/8/01
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): AP2Left

MGA Test Reference No.: FM4700

Approach Horizontal Angles: 202°

Approach Vertical Angles: 46°

Additional Description:

Test Number: #8

Temperature: 24 C

Humidity: 38%

Time of Test: 1:45 PM

FMH Serial No: 036

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
785	819	5.3	23.3	13	9 R

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-99.8	1.47	1.47
Y	6	J35916	99.7	1.54	1.54
Z	7	J35918	98.1	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By: [Signature] Date: 11/17/04

*Only necessary for NHTSA (Government) Compliance testing.

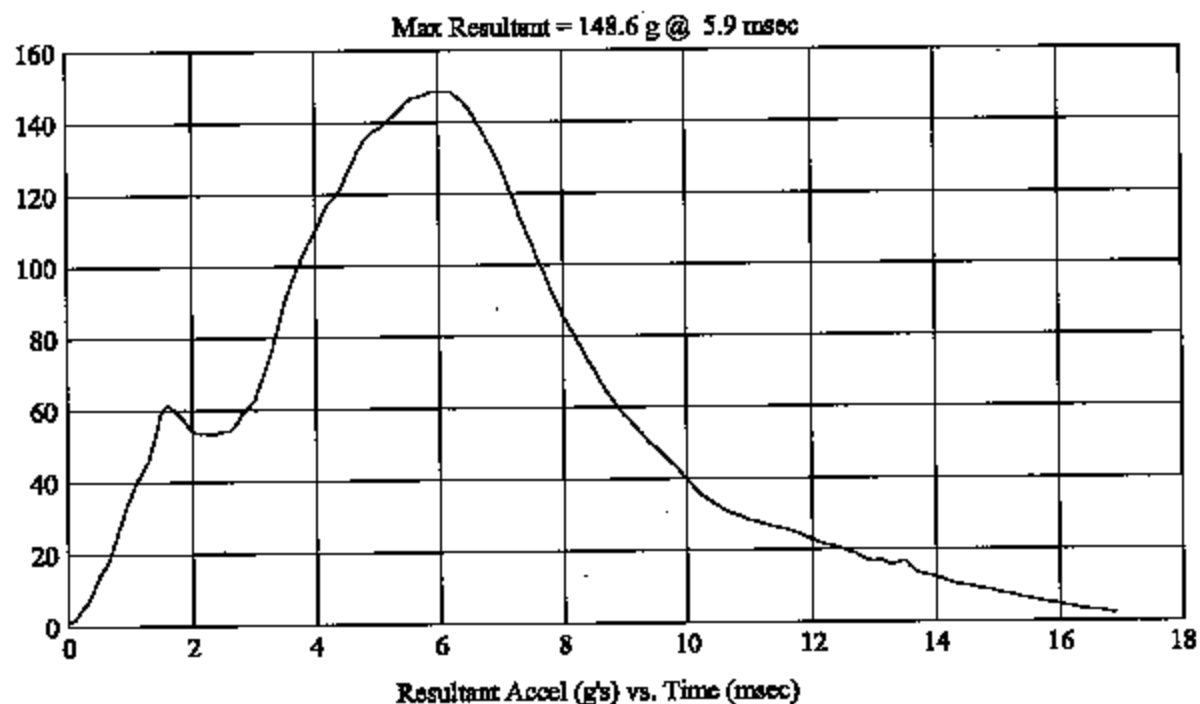
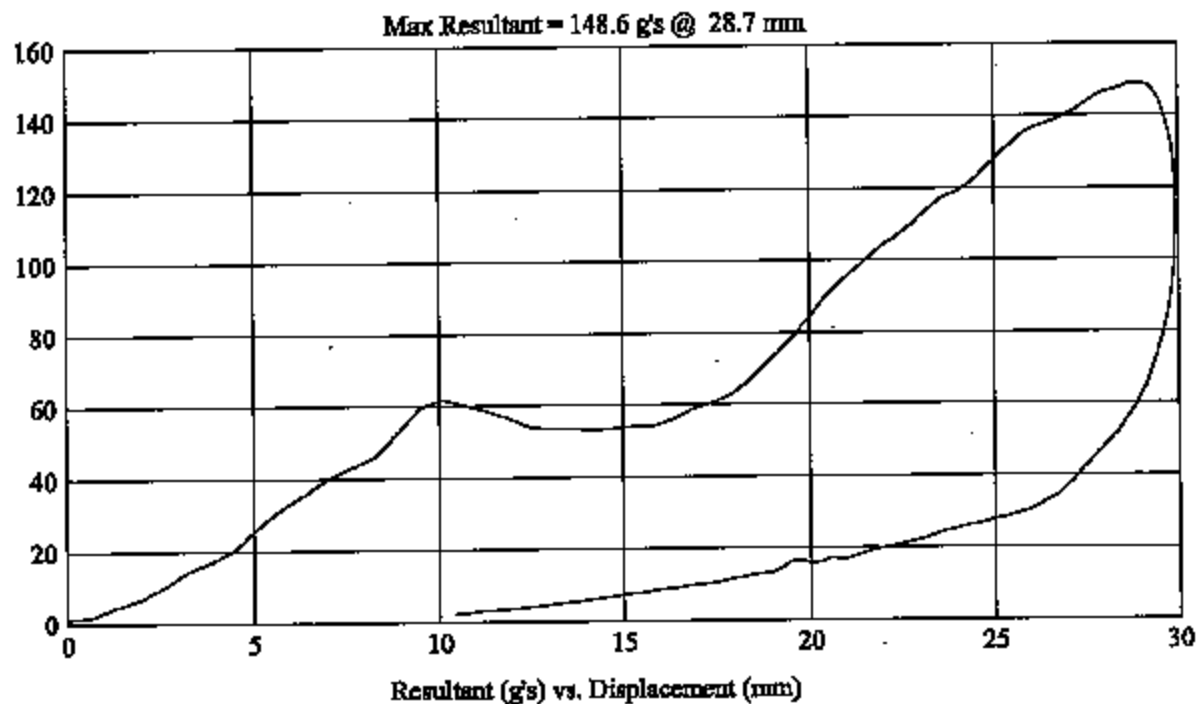
Customer: DODGE
Test # 8
FM4700
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 202/46

HIC(d) = 785, HIC = 819, Delta T = 5.3 msec



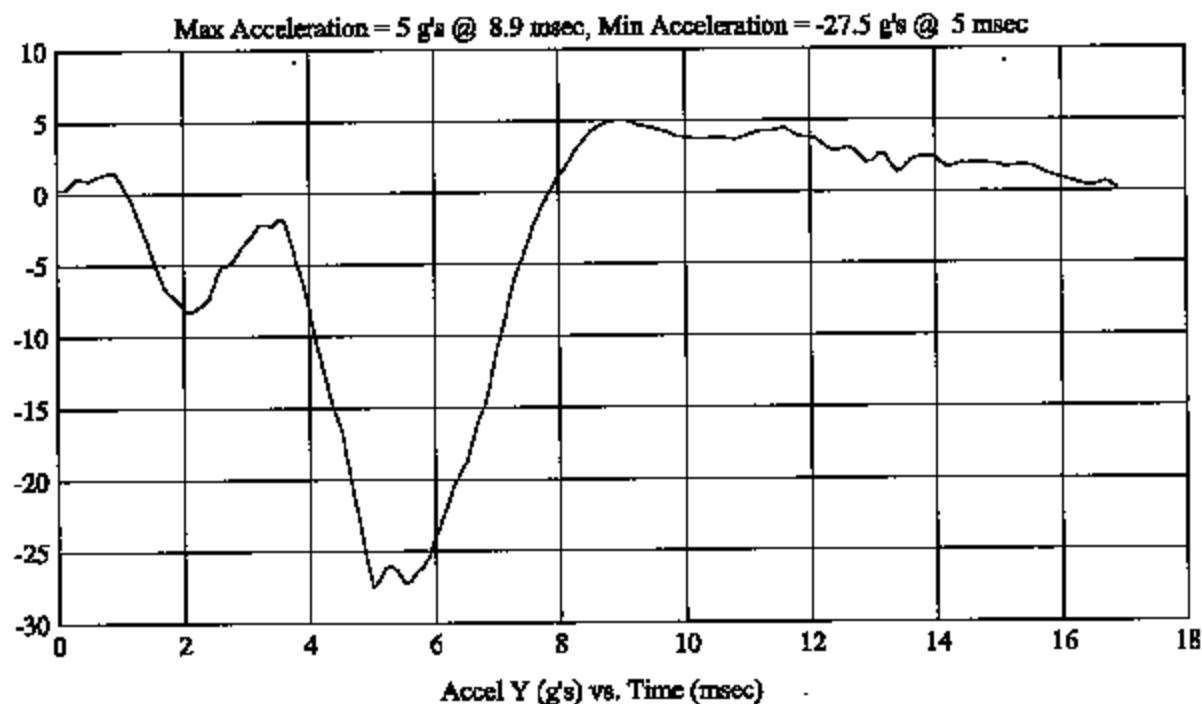
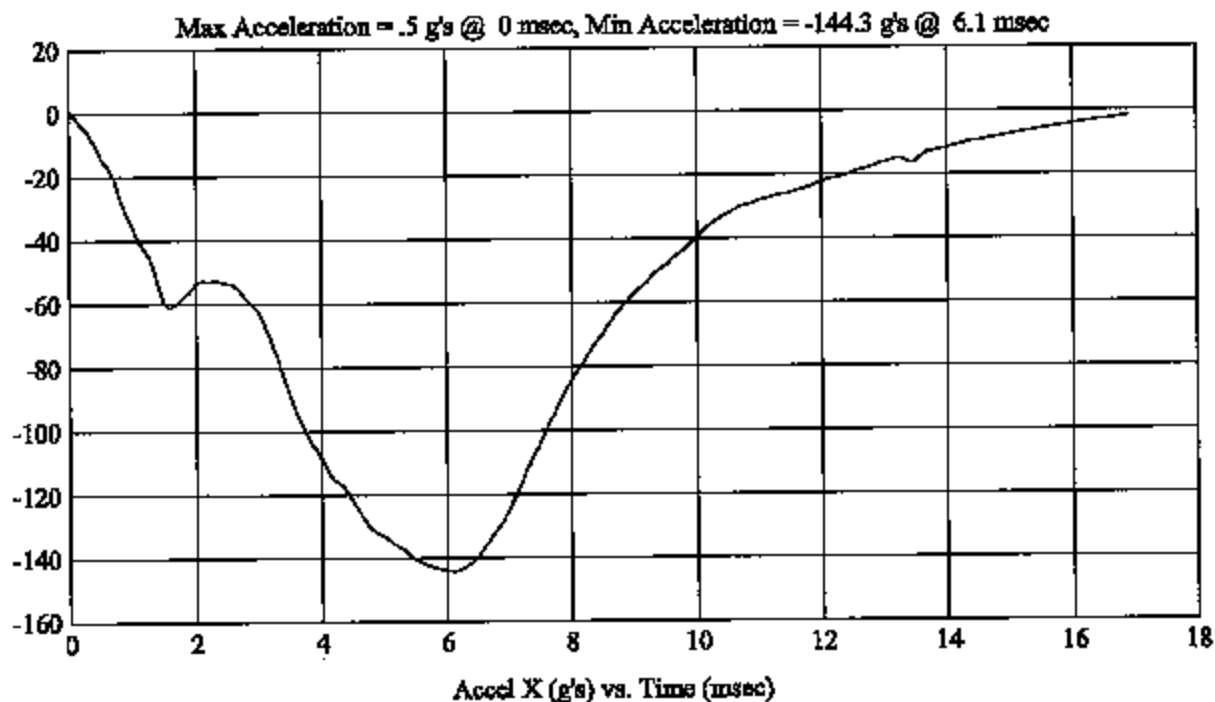
Customer: DODGE
Test # 8
FM4700
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 202/46

HIC(d) = 785, HIC = 819, Delta T = 5.3 msec



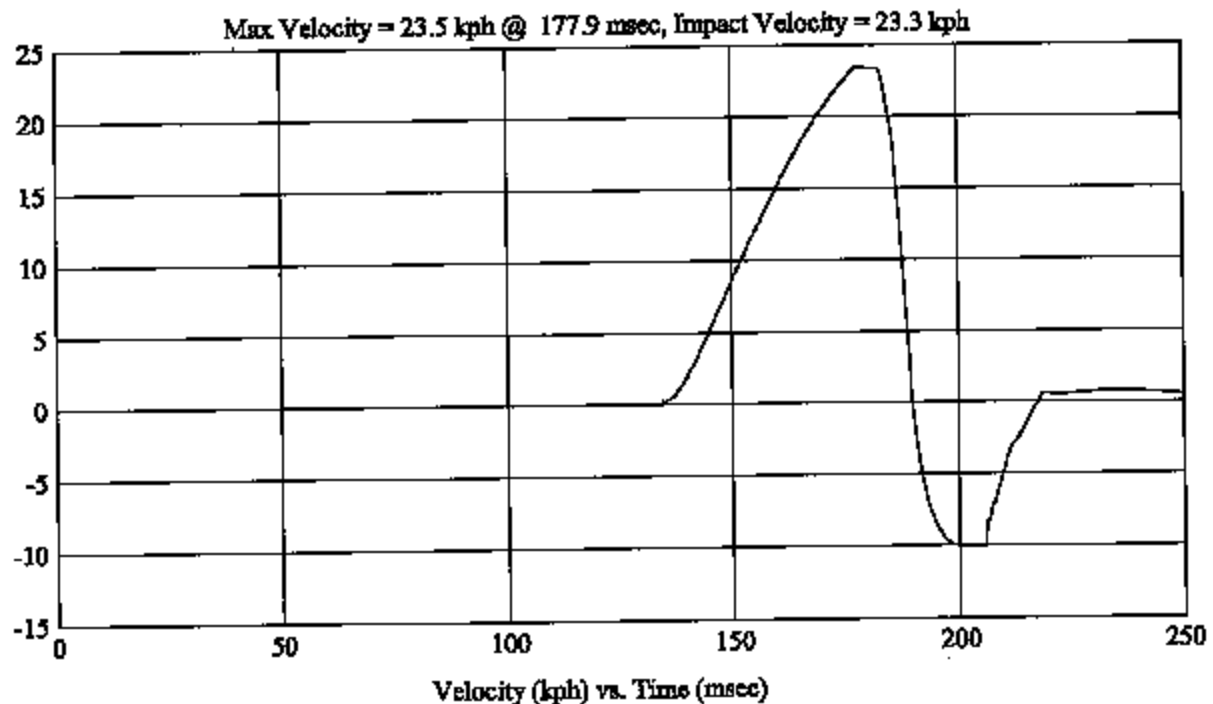
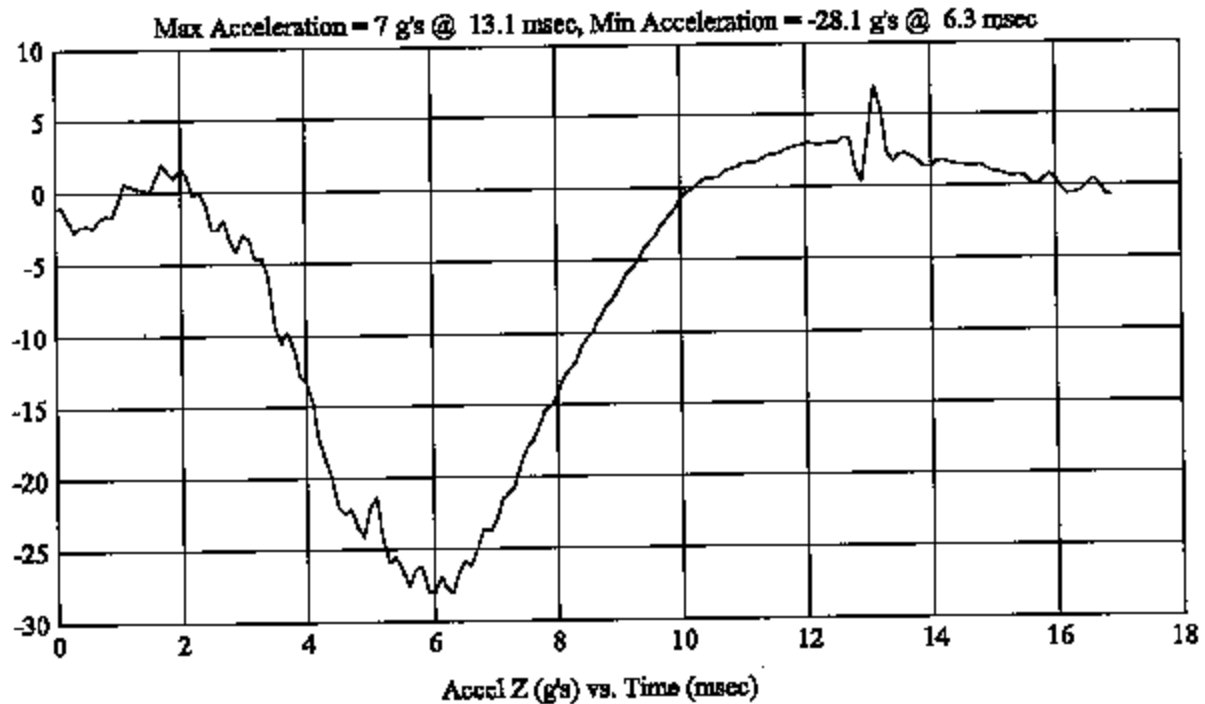
Customer: DODGE
Test # 8
FM4700
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 202/46

HIC(d) = 785, HIC = 819, Delta T = 5.3 msec



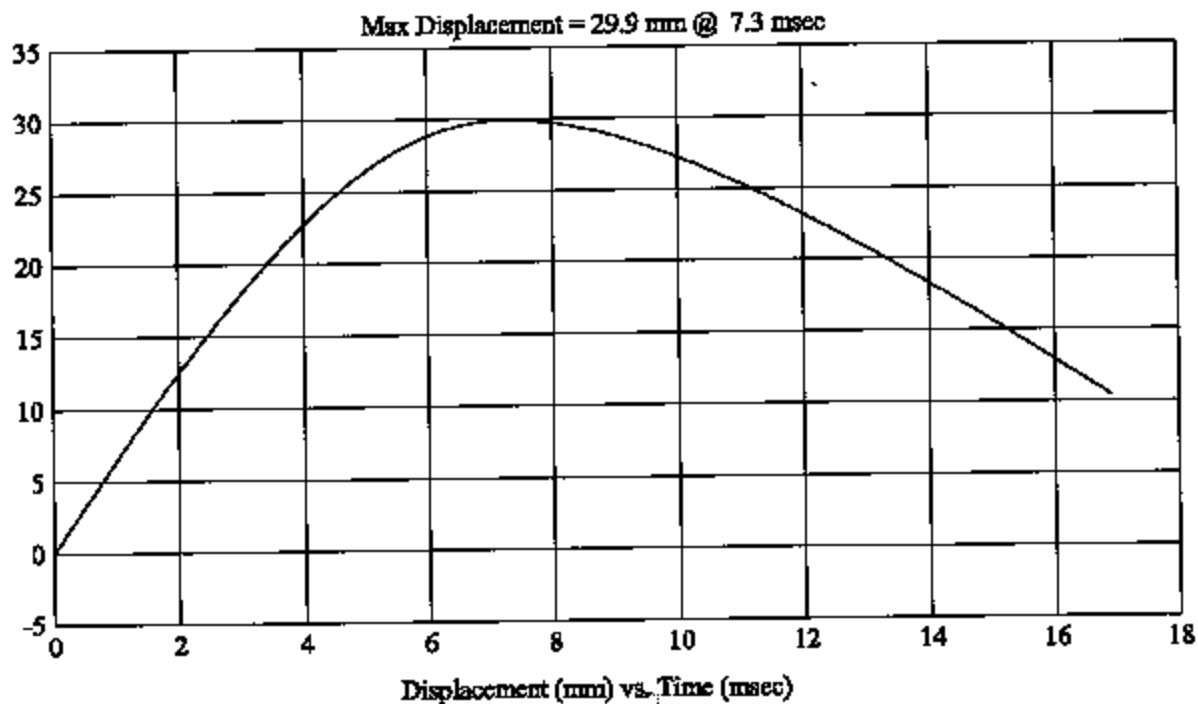
FMH
G05I7-001.1Customer: DODGE
Test # 8
FM4700
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: AP2
Vehicle Side: Left
Horz/Vert Angle: 202/46

HIC(d) = 785, HIC = 819, Delta T = 5.3 msec



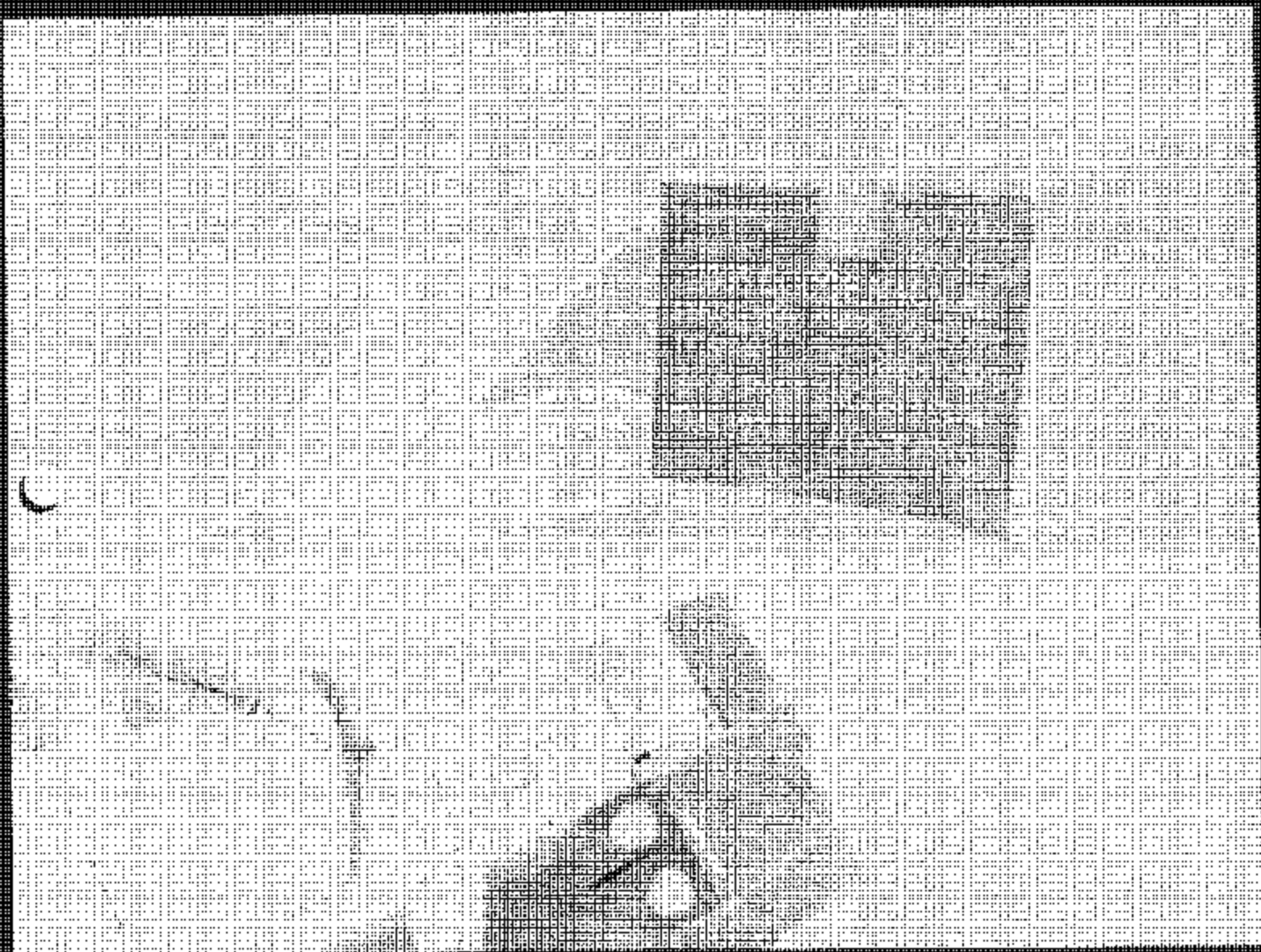
MATERIAL

5110-04

Impact Testing

001-001-1

2005 DODGE MAGNUM
PASS MID-UPPER INTERIOR
RIGHT AP3
TEST #1
HV IMPACT ANGLE = 159 / 41
PM1693 PRE-TEST





MICHIGAN OPERATIONS
DATE: 2/8/01
SUPERCEDES: MGATP207210.2

DOC. NO.: MGATP207210.3
REVISION NO.: 2
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): AP3 Right
MGA Test Reference No.: FM4893
Approach Horizontal Angles: 159°
Approach Vertical Angles: 41°
Additional Description:

Test Number: #1
Temperature: 24C
Humidity: 30%
Time of Test: 11:55 AM
FMH Serial No: 035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
742	763	7.3	23.9	15	0

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-94.1	1.47	1.48
Y	6	J35919	94.3	1.54	1.54
Z	7	J22664	92.7	1.46	1.25

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: Made J. Miller Approved By: [Signature] Date: 11/16/04
*Only necessary for NHTSA (Government) Compliance testing.

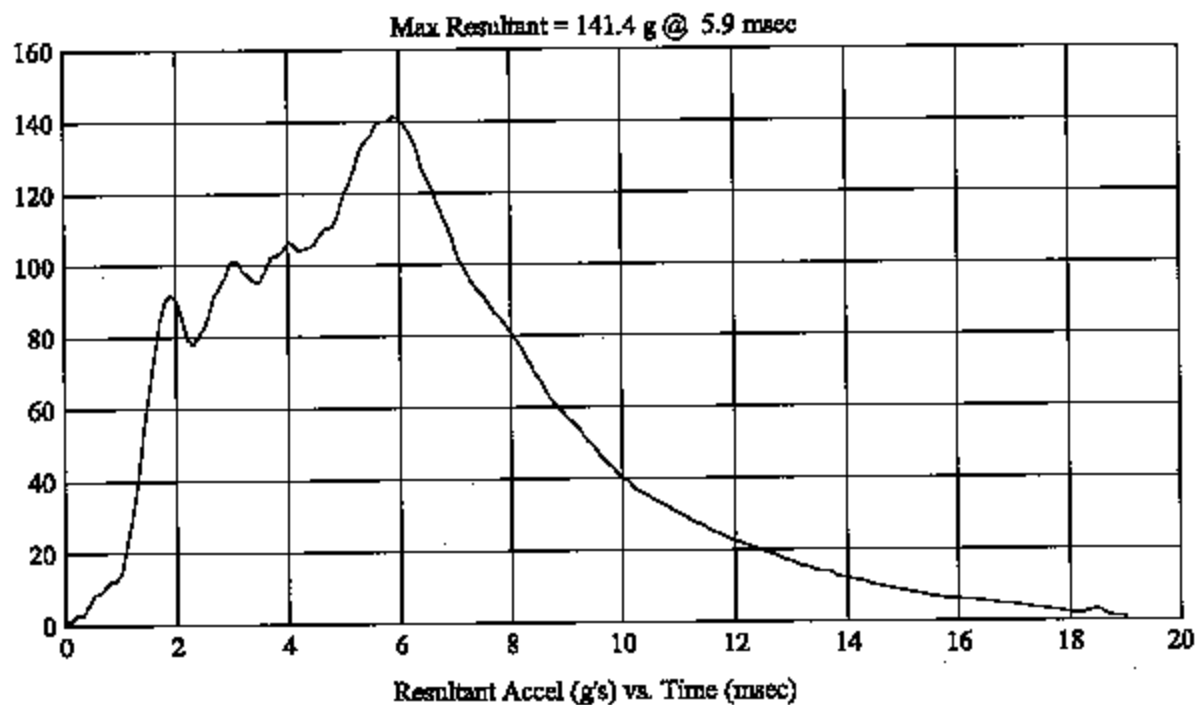
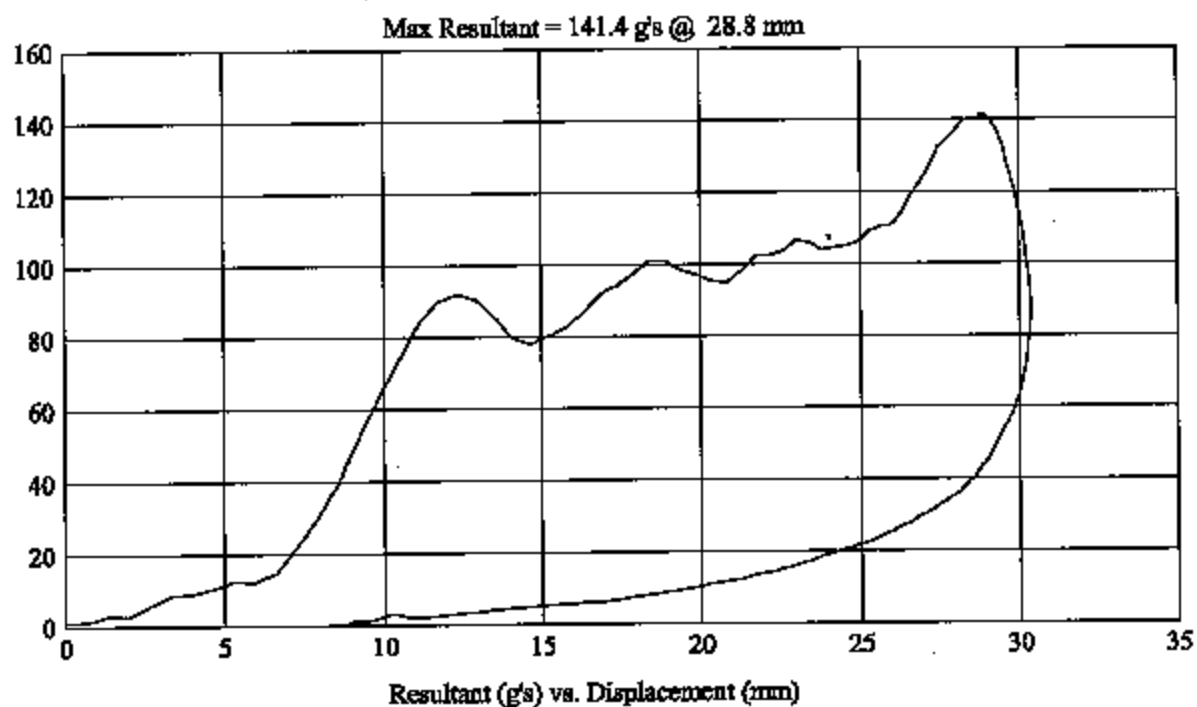
FMH
G0517-001.1Customer: DODGE
Test # 1
FM4693
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 159/41

HIC(d) = 742, HIC = 763, Delta T = 7.3 msec



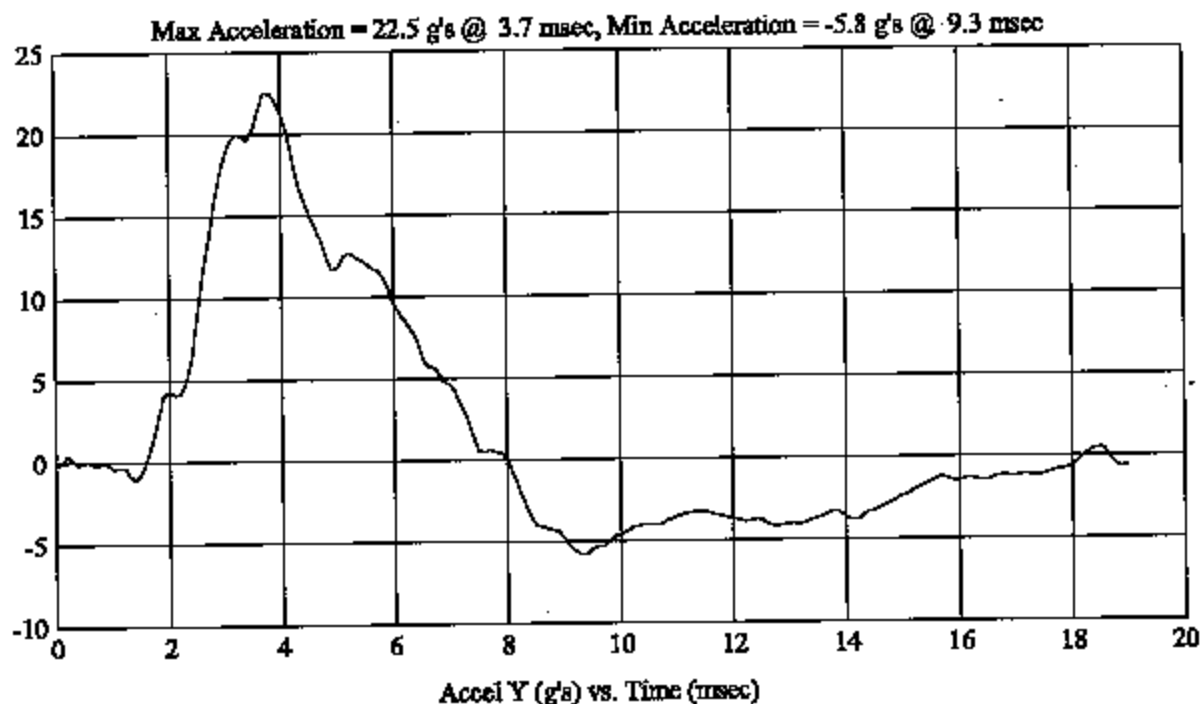
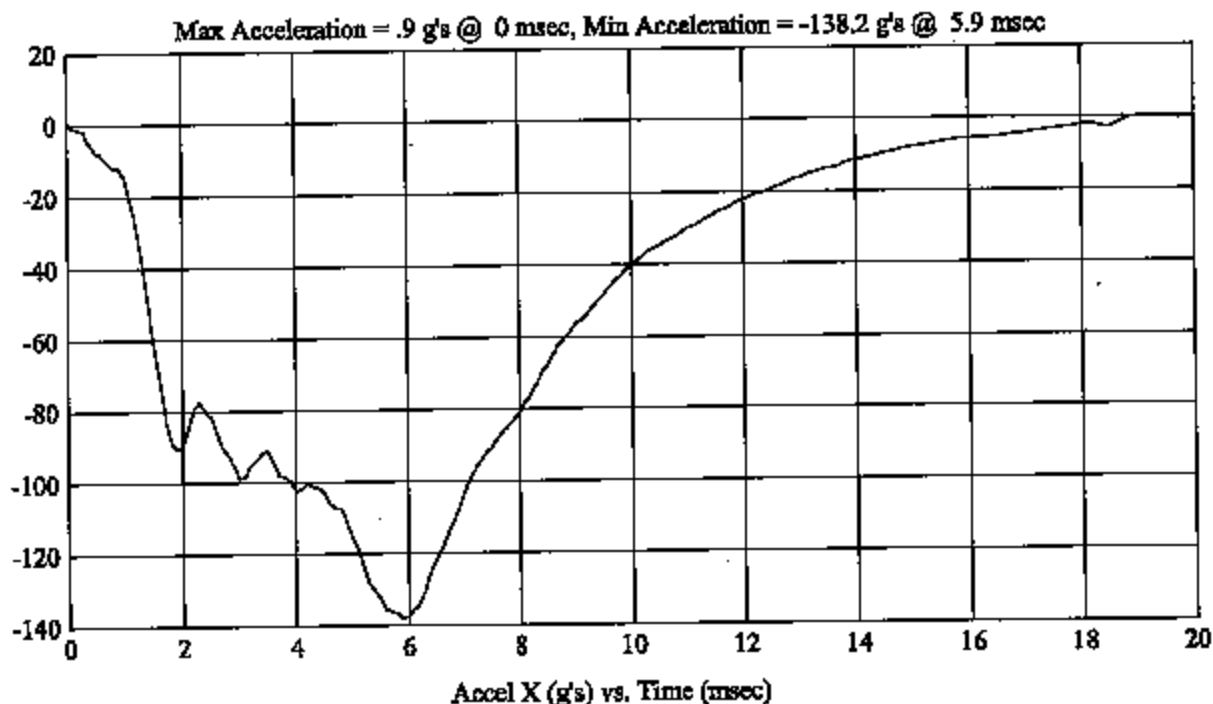
FMH
G05T7-001.1Customer: DODGE
Test # 1
FM4693
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 159/41

HIC(d) = 742, HIC = 763, Delta T = 7.3 msec



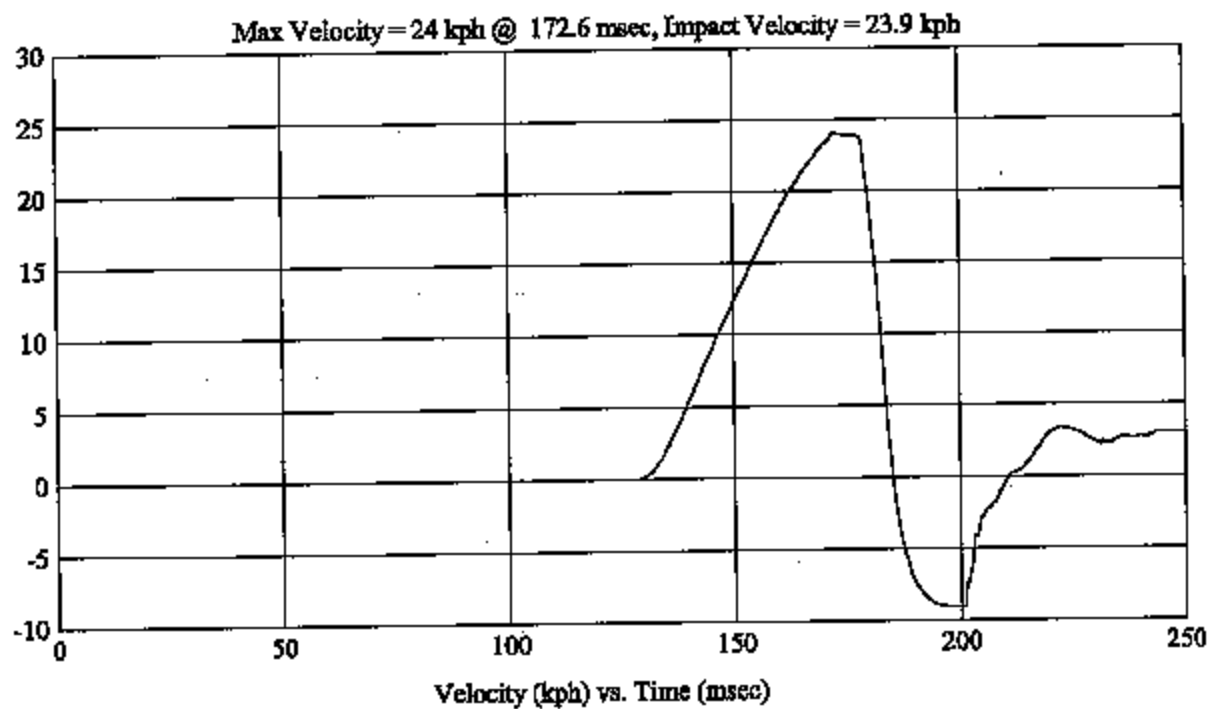
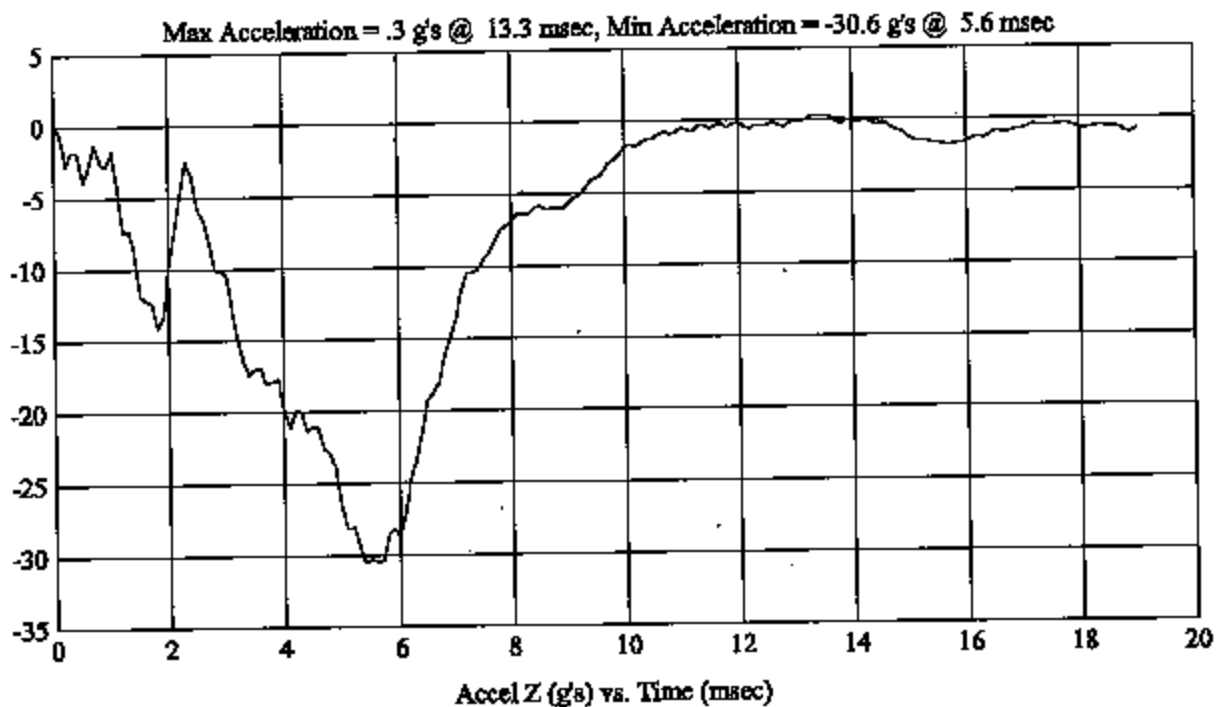
FMH
G05I7-001.1Customer: DODGE
Test # 1
FM4693
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 159/41

HIC(d) = 742, HIC = 763, Delta T = 7.3 msec



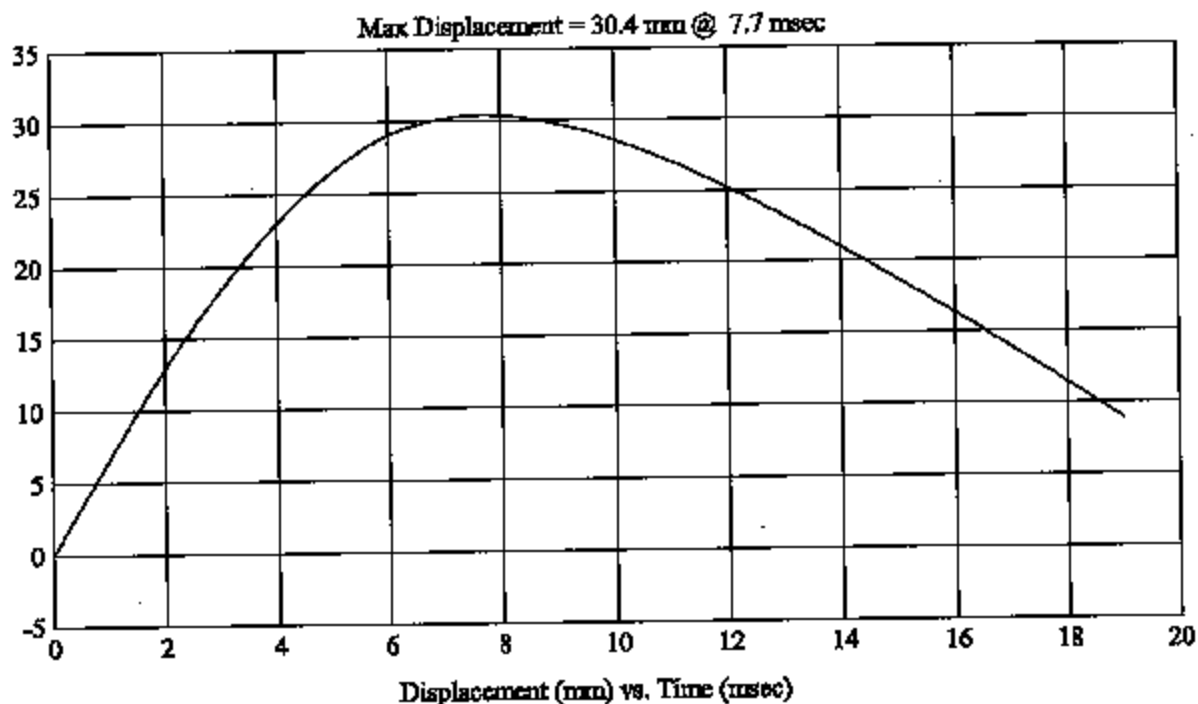
FMH
G05I7-001.1Customer: DODGE
Test # 1
FM4693
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: AP3
Vehicle Side: Right
Horz/Vert Angle: 159/41

HIC(d) = 742, HIC = 763, Delta T = 7.3 msec



2005 DODGE MAGNITA
PASS 2000 - UPPER INTERIOR
TEST #11 LEFT BPI
HV IMPACT ANGLE = 30 DEG
FM4703 PRE-TEST

2005 DODGE MAGNUM

Impact Testing

11/17/04

60547-011

2005 DODGE MAGNUM

FMVSS 2010 - UPPER INTERIOR

TEST #11 LEFT BPI

HV IMPACT ANGLE = 270 / 14

FM4703 POST-TEST

PERFORMANCE TESTS

Impact Testing

11/17/04

CONF-0011

2006 DODGE MAGNUM

FMVSS 2010 - UPPER INTERIOR

TEST #11 LEFT BP1

HV IMPACT ANGLE = 27D / 14

FM4703

POST-TEST

MICHIGAN OPERATIONS
DATE: 2/8/01
SUPERCEDES: MGATP207210.2

DOC. NO.: MGATP207210.3
REVISION NO.: 2
PAGE 1 OF 1.

SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): BP1 Left

MGA Test Reference No.: FM4703

Approach Horizontal Angles: 270°

Approach Vertical Angles: 14°

Additional Description:

Test Number: #11

Temperature: 24C

Humidity: 38%

Time of Test: 4:00 PM

FMH Serial No: 035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
458	387	12	24.0	33	10 L

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-94.1	1.47	1.47
Y	6	J35919	94.3	1.54	1.54
Z	7	J22664	92.7	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

Headliner displacement

Recorded By: [Signature] Approved By: [Signature] Date: 11/17/04

*Only necessary for NHTSA (Government) Compliance testing.

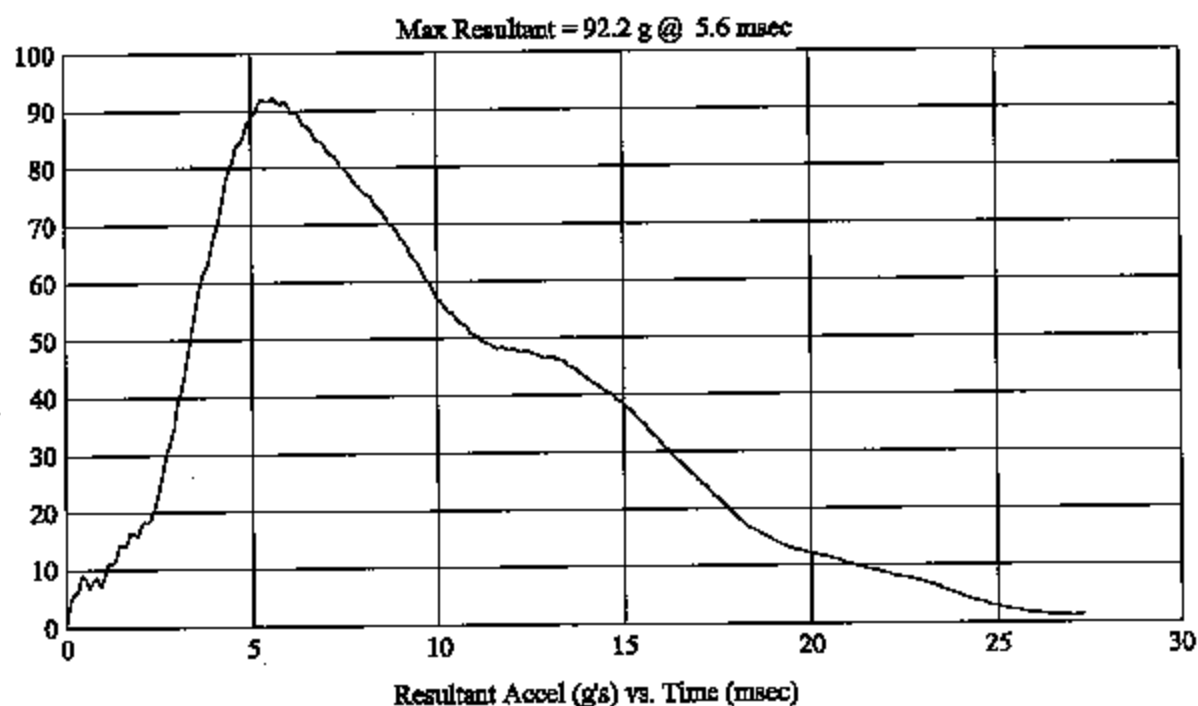
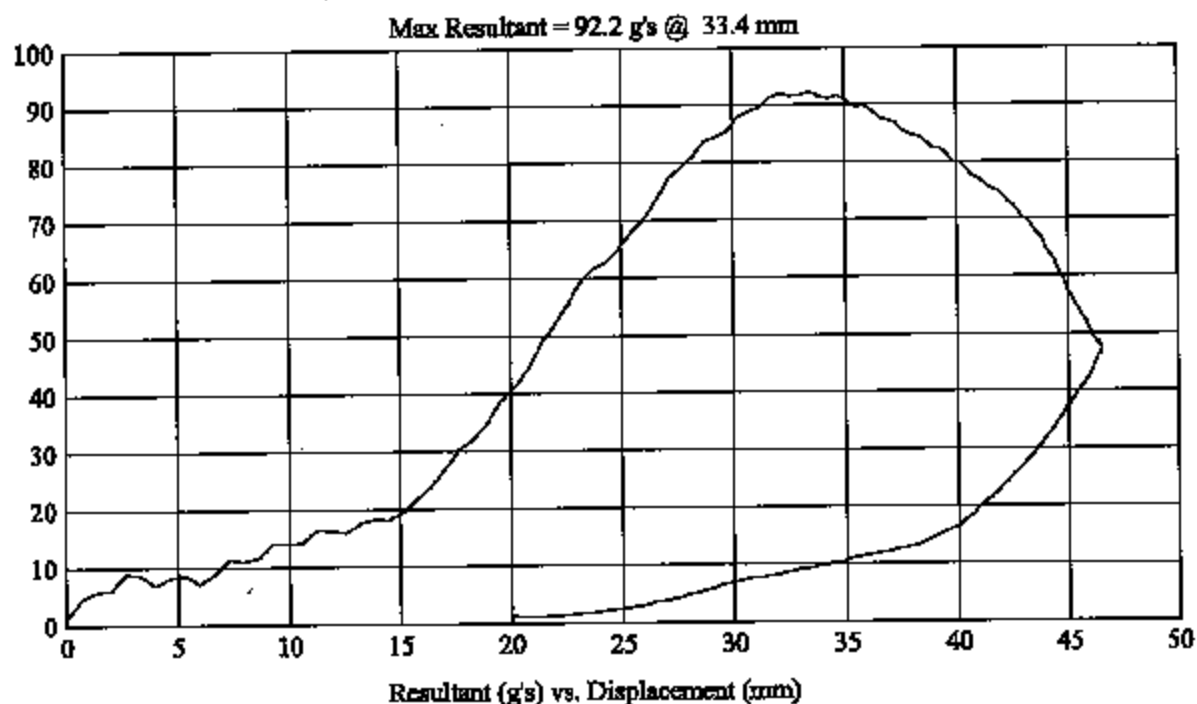
FMH
G0517-001.1Customer: DODGE
Test # 11
FM4703
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP1
Vehicle Side: Left
Horz/Vert Angle: 270/14

HIC(d) = 458, HIC = 387, Delta T = 12 msec



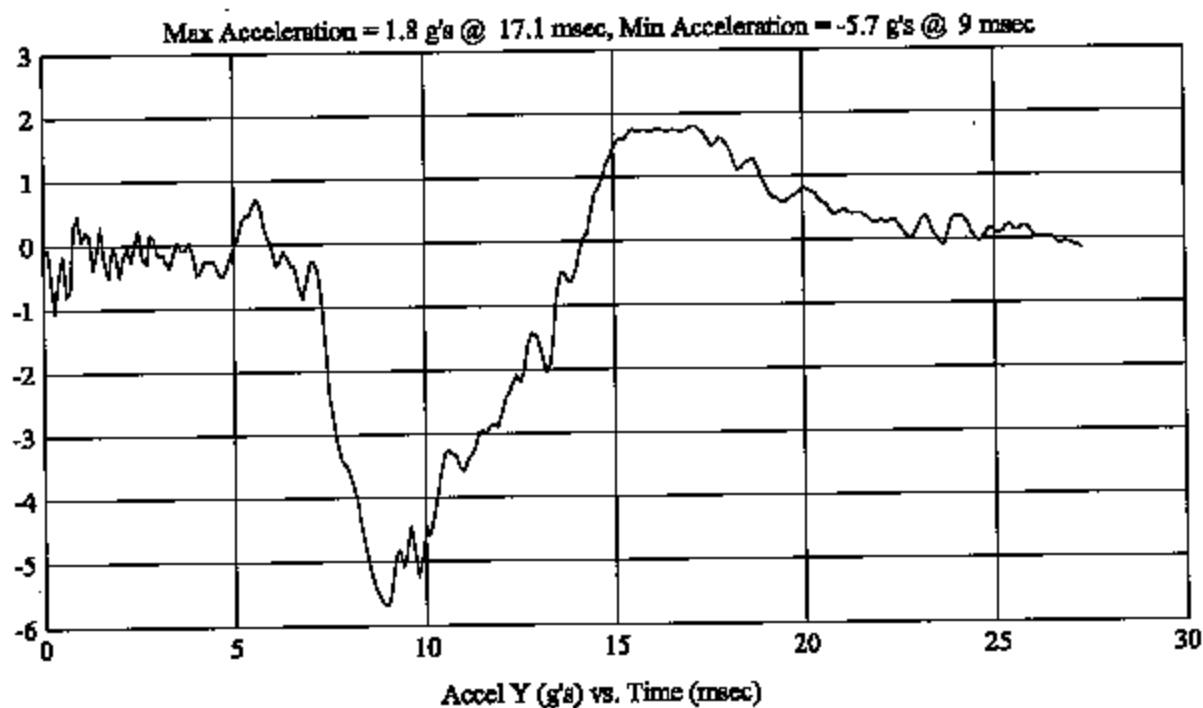
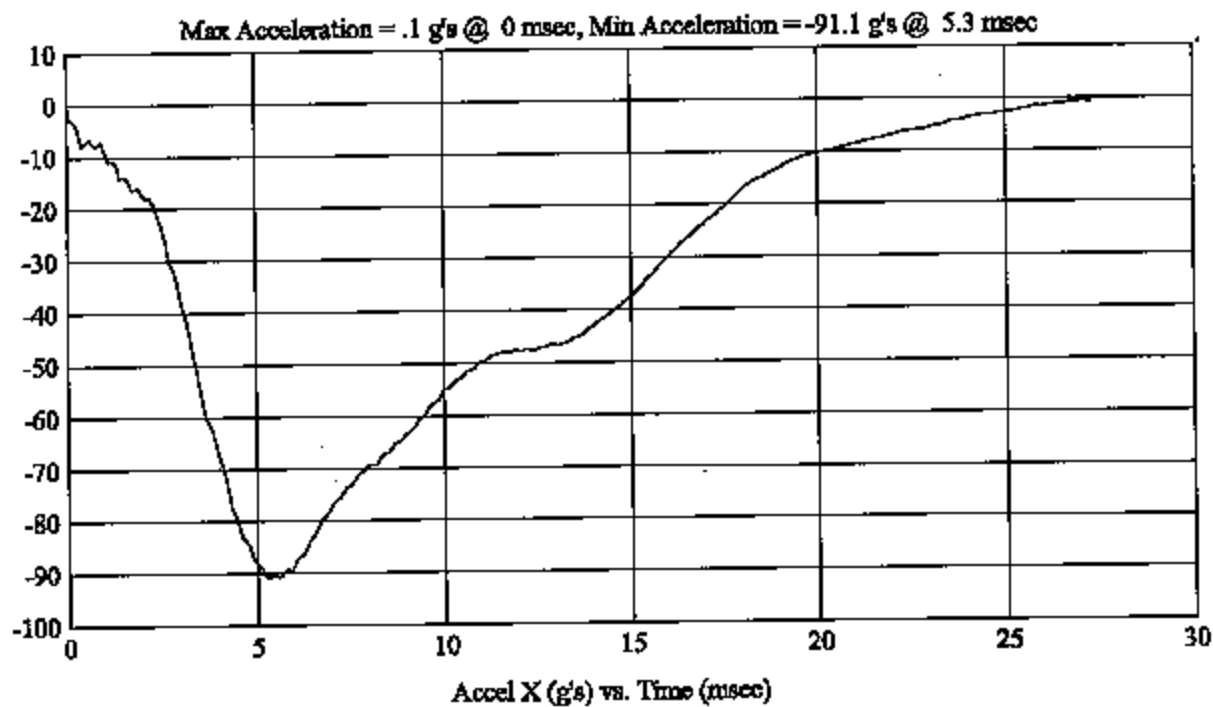
FMH
G0517-001.1Customer: DODGE
Test # 11
FM4703
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP1
Vehicle Side: Left
Horz/Vert Angle: 270/14

HIC(d) = 458, HIC = 387, Delta T = 12 msec



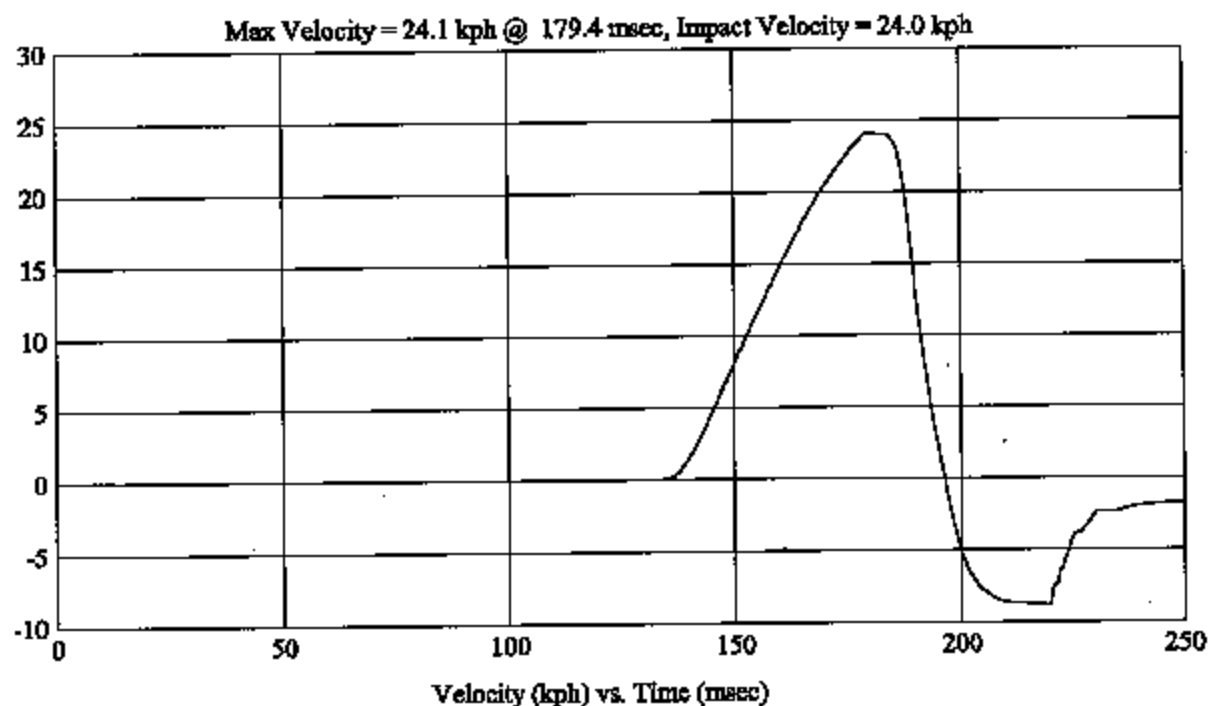
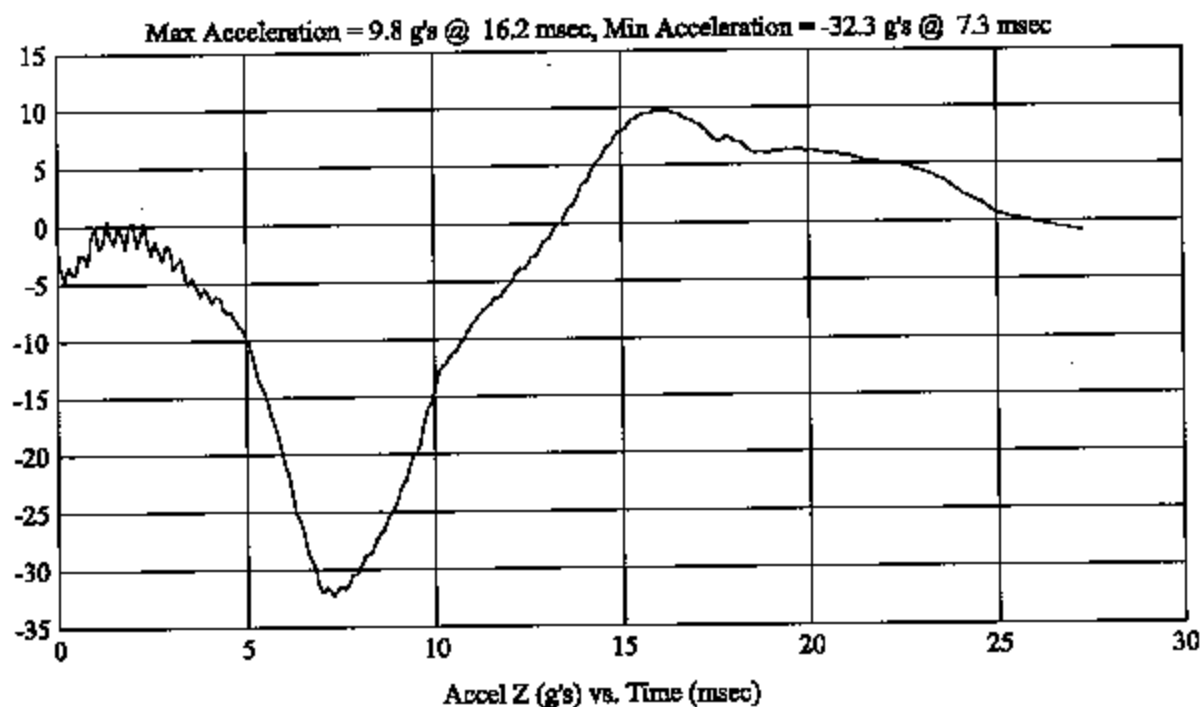
FMH
G05I7-001.1Customer: DODGE
Test # 11
FM4703
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP1
Vehicle Side: Left
Horz/Vert Angle: 270/14

HIC(d) = 458, HIC = 387, Delta T = 12 msec



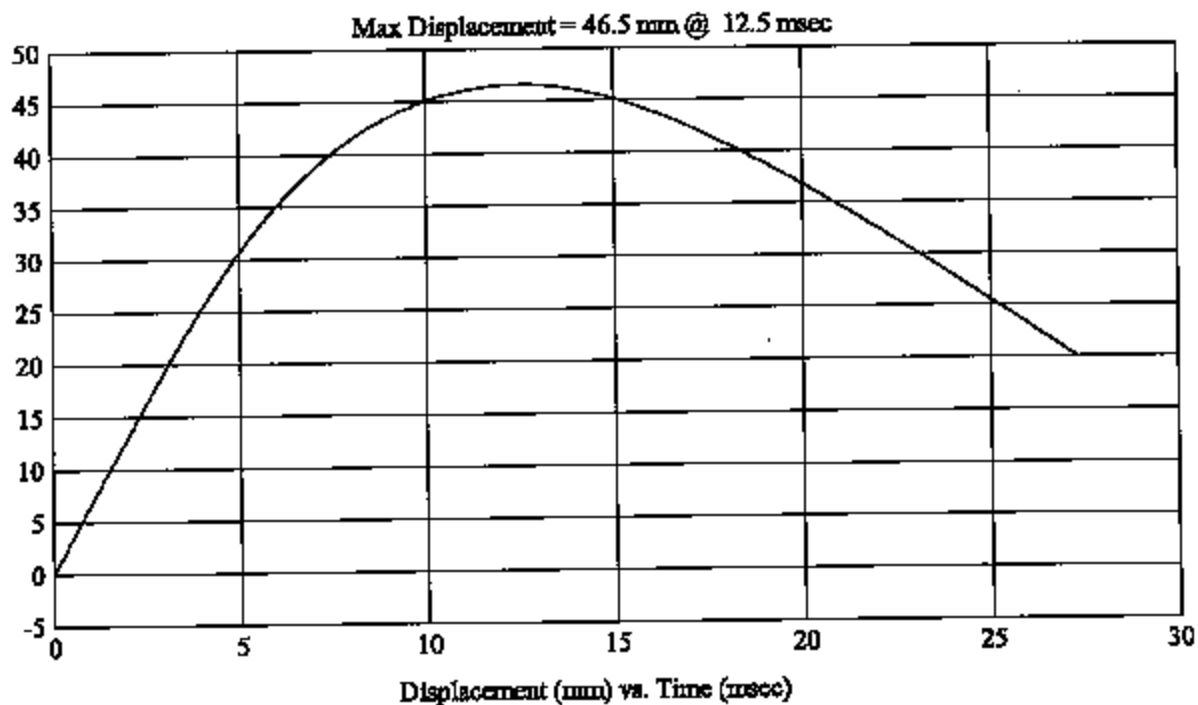
FMH
G05X7-001.1Customer: DODGE
Test # 11
FM4703
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP1
Vehicle Side: Left
Horz/Vert Angle: 270/14

HIC(d) = 458, HIC = 387, Delta T = 12 msec



TEST DATE

1/17/04

TEST TIME

0657:00.1

2005 DODGE MAGNUM

FMVSS 201J - UPPER INTERIOR

TEST #10

LEFT SP2

HV IMPACT ANGLE = 270°

FM4702

PRE-TEST

FM4703

FM4703

FM4704

FM4704

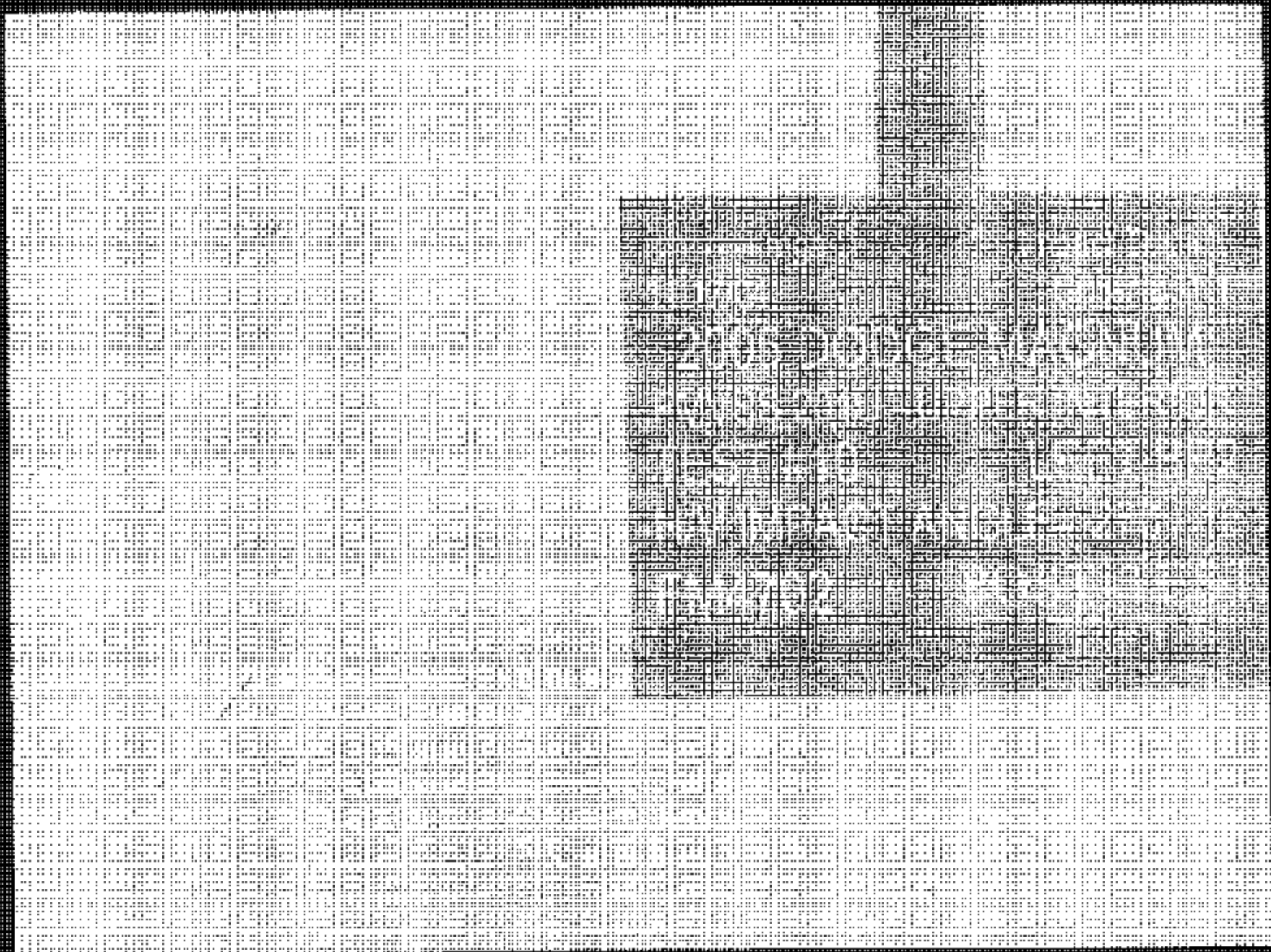
2005 DODGE MAGNUM

FMVSS 2010 - UPPER INTERIOR

TEST #10 - LEFT BP2

HV IMPACT ANGLE = 270/15

FM4702 - POST-IMPACT



MICHIGAN OPERATIONS
DATE: 2/8/01
SUPERCEDES: MGATP207210.2

DOC. NO.: MGATP207210.3
REVISION NO.: 2
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL:2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): BP2 Left

MGA Test Reference No.:FM4702

Approach Horizontal Angles:270°

Approach Vertical Angles:15°

Additional Description:

Test Number:#10

Temperature:24C

Humidity:38%

Time of Test:3:15 PM

FMH Serial No:038

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
678	679	10.6	23.9	18	3 L

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7284-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	6	J38197	-110	1.47	1.47
Y	6	J36193	101.9	1.54	1.54
Z	7	J38353	96.7	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By: [Signature] Date: 11/17/04

*Only necessary for NHTSA (Government) Compliance testing.

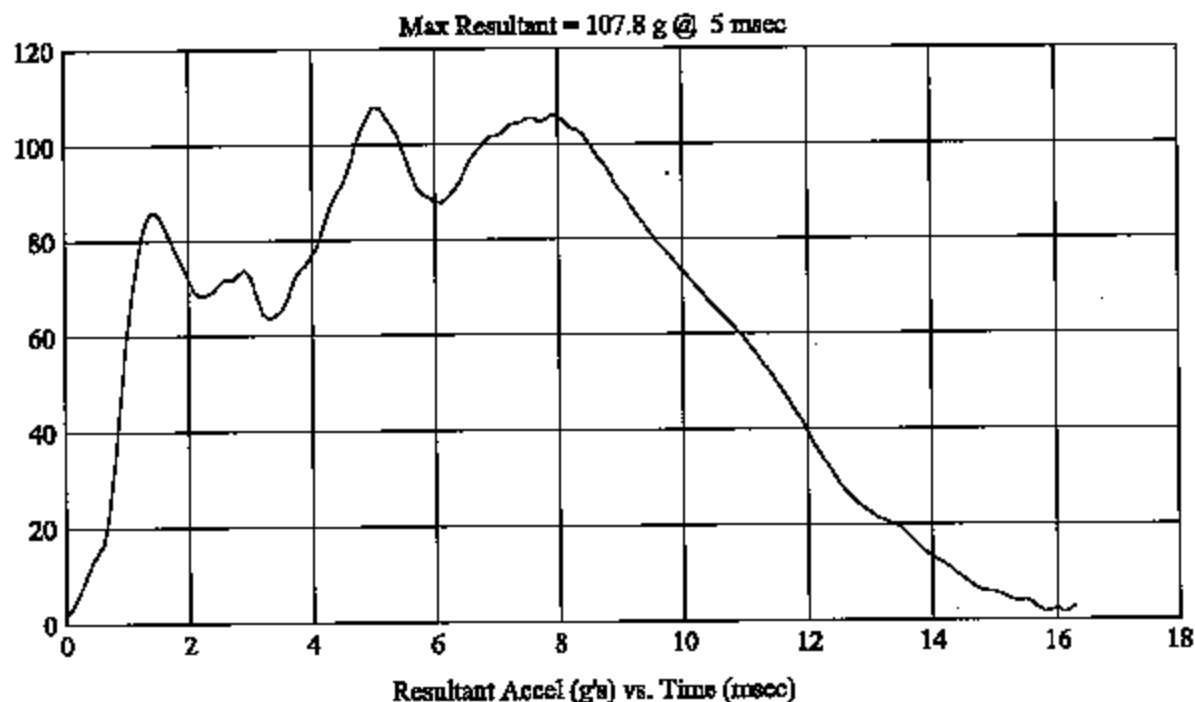
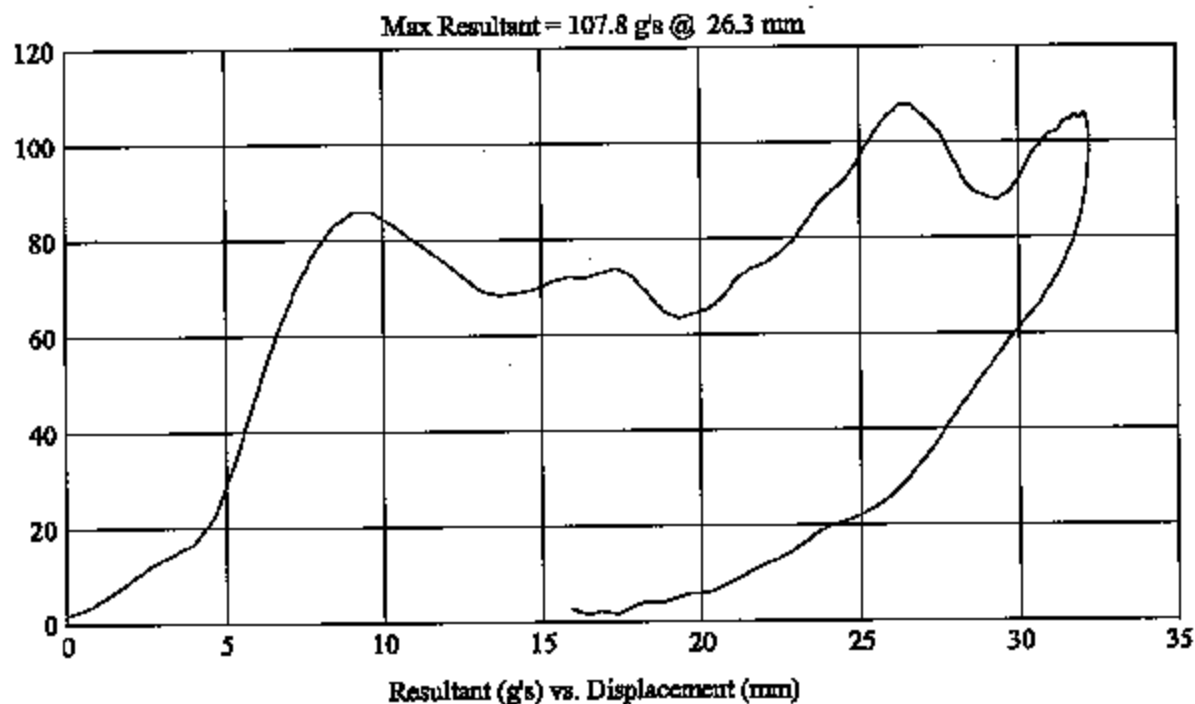
Customer: DODGE
Test # 10
FM4702
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/15

HIC(d) = 678, HIC = 679, Delta T = 10.6 msec



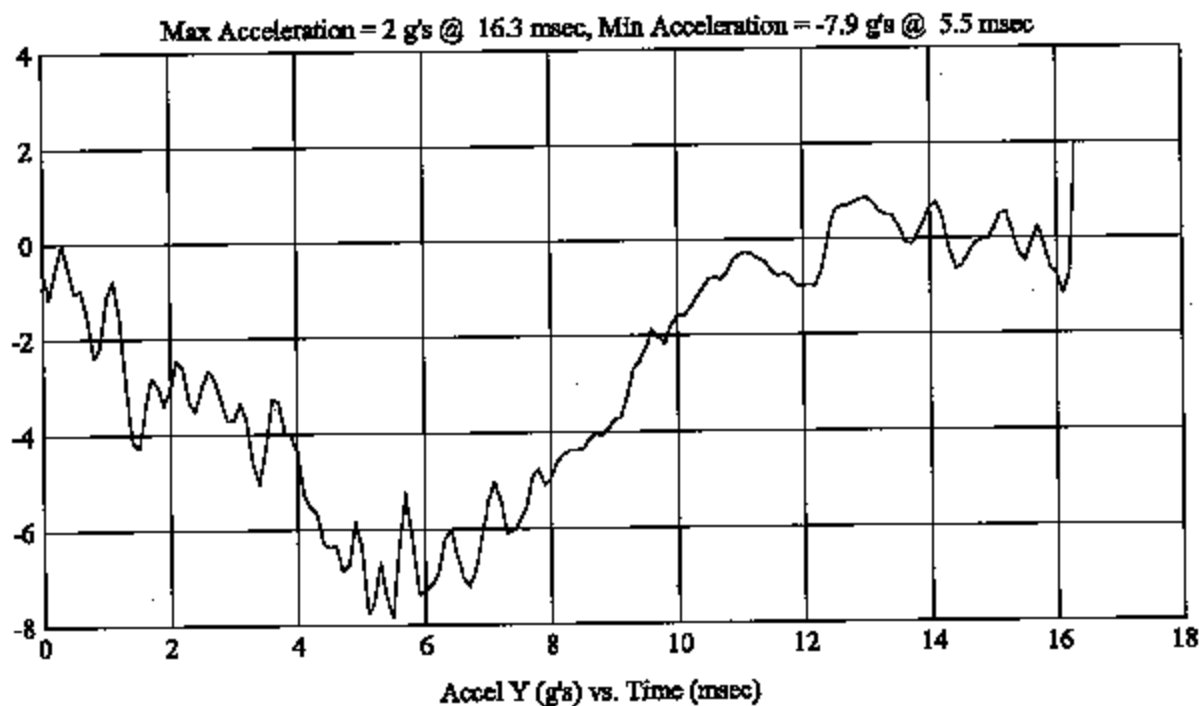
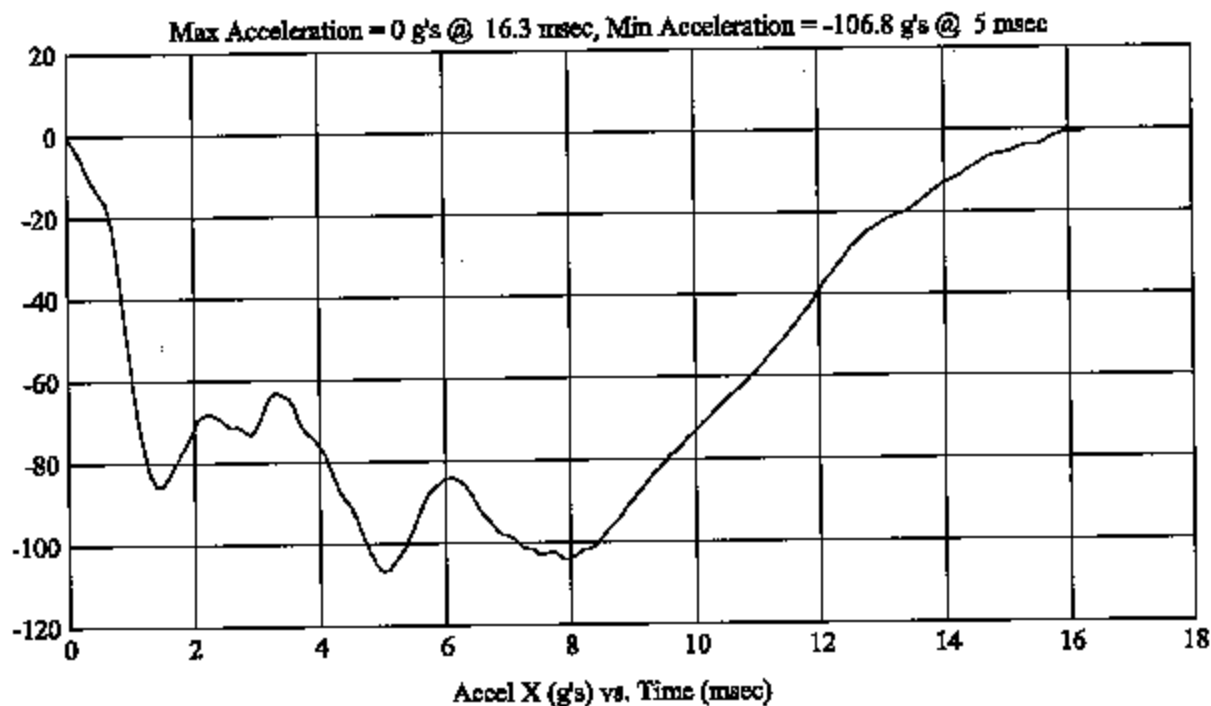
Customer: DODGE
Test # 10
FM4702
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/15

HIC(d) = 678, HIC = 679, Delta T = 10.6 msec



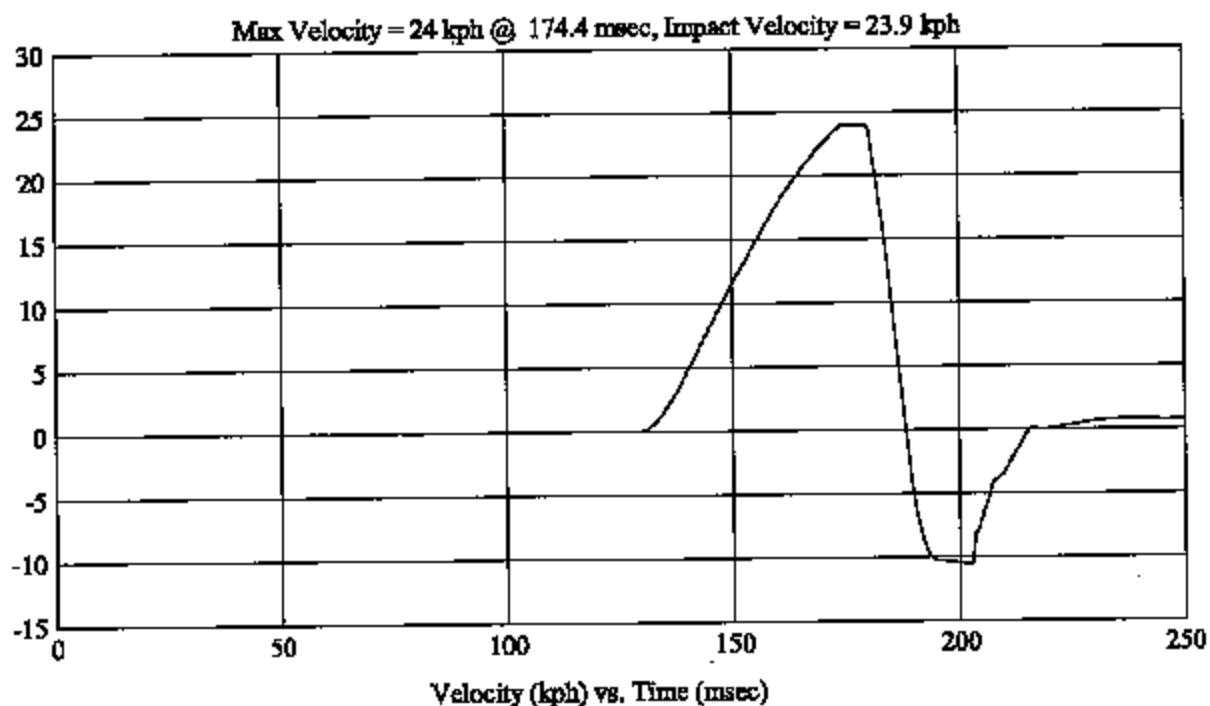
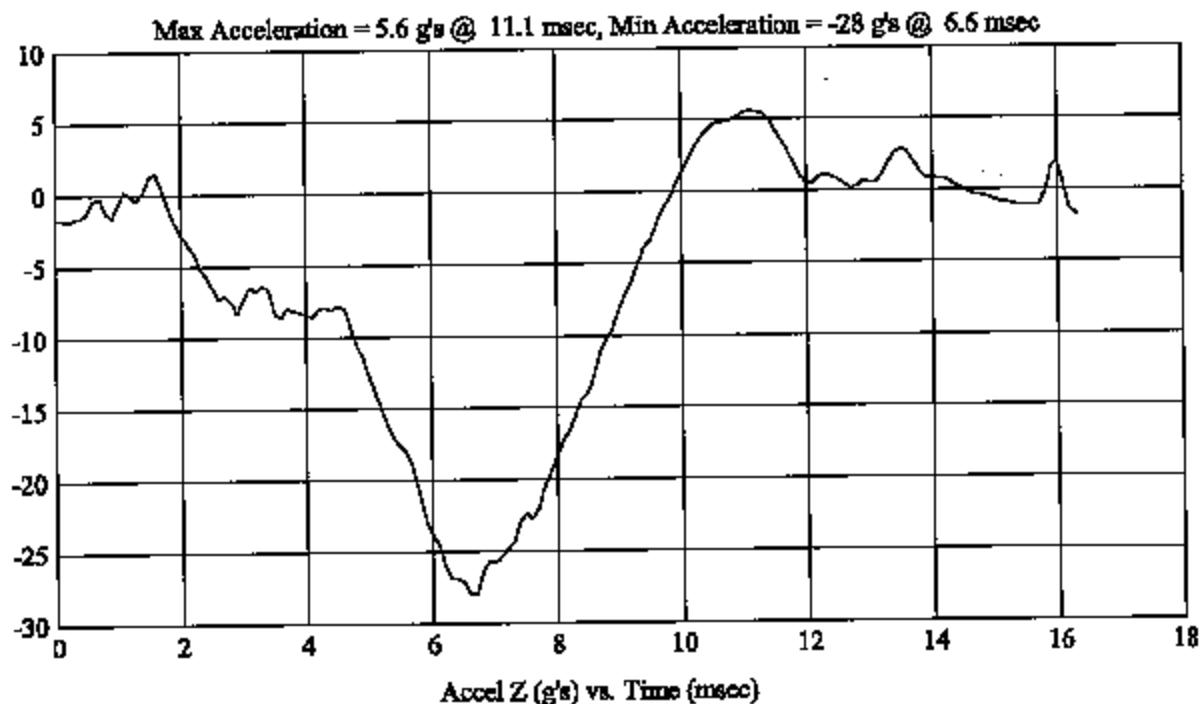
FMH
G05I7-001.1Customer: DODGE
Test # 10
FM4702
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/15

HIC(d) = 678, HIC = 679, Delta T = 10.6 msec



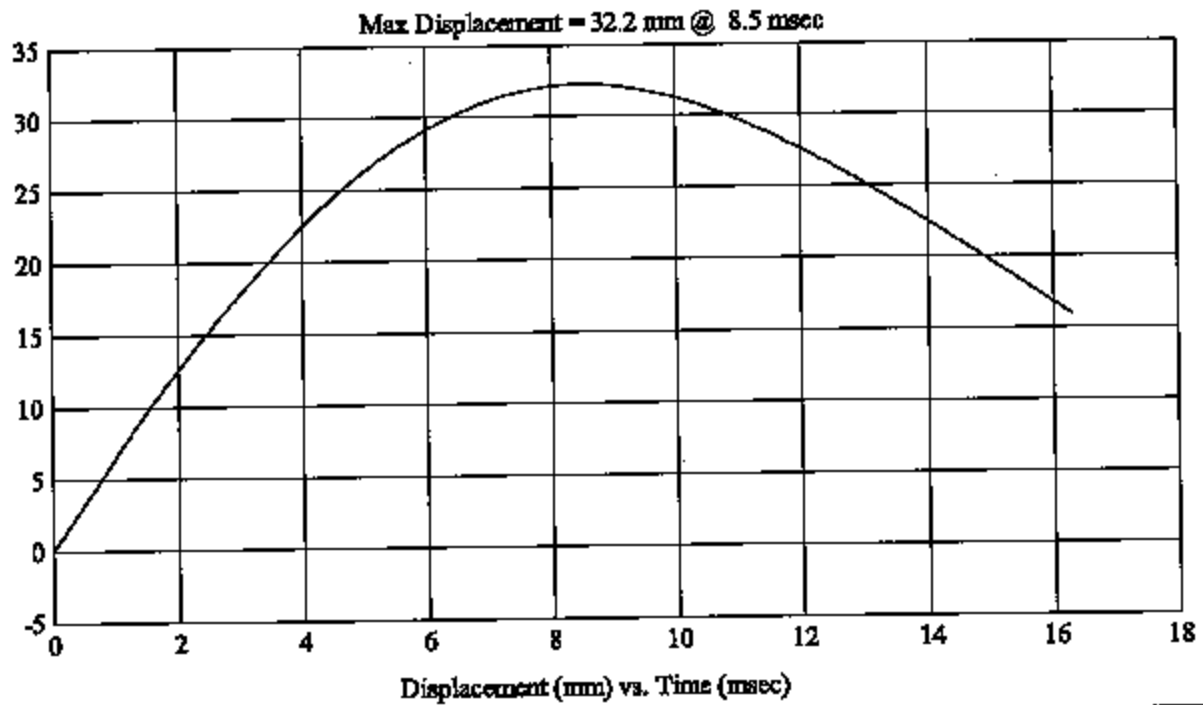
Customer: DODGE
Test # 10
FM4702
Additional Desc: N/A

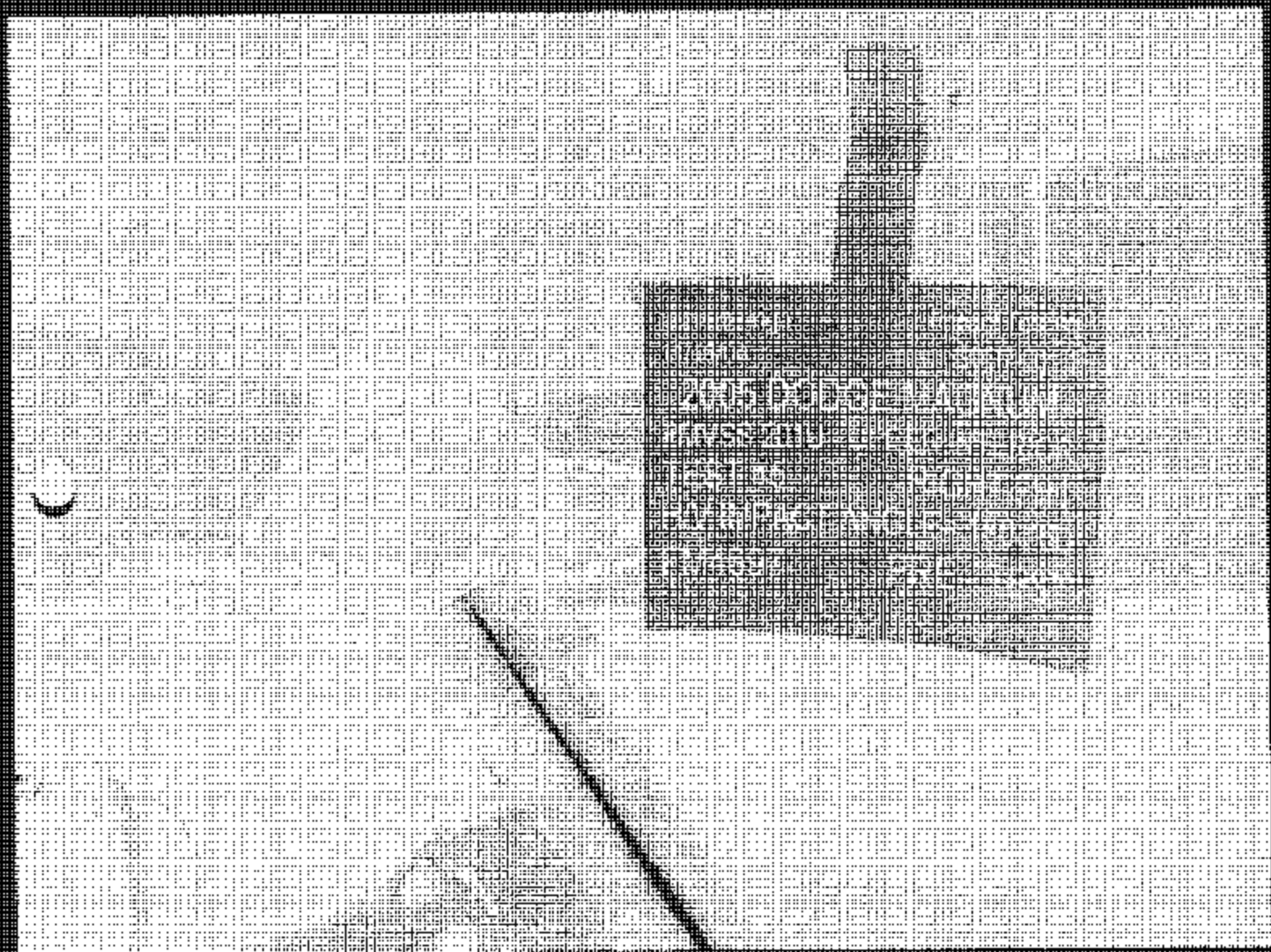
Vehicle Program : MAGNUM

Test Date: 11/17/04

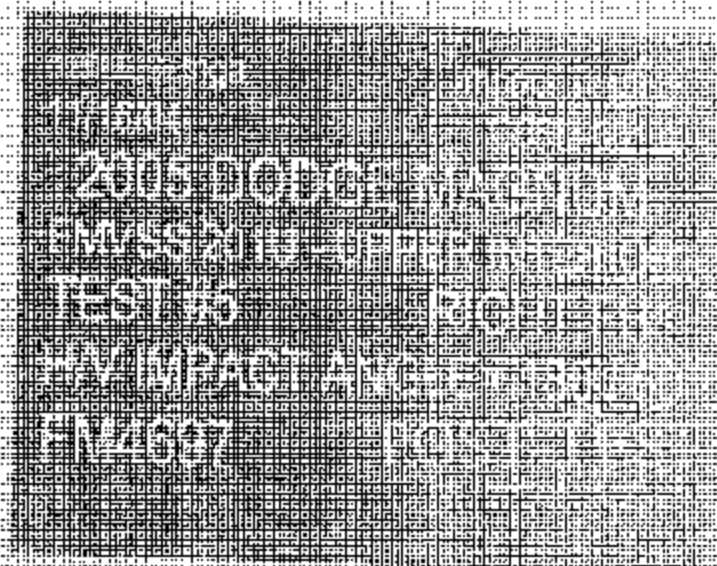
Model Year: 2005
Target: BP2
Vehicle Side: Left
Horz/Vert Angle: 270/15

HIC(d) = 678, HIC = 679, Delta T = 10.6 msec





2005 DODGE MAGNUM
ST550U UPPER INTERIOR
ELECTRIC RIGHT WINDOW
IMPACT ANGLE 130-01
14617 10541125



MICHIGAN OPERATIONS
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Test Number: #5

Target (Vehicle Side): FH1 Right

Temperature: 25C

MGA Test Reference No.: FM4697

Humidity: 30%

Approach Horizontal Angles: 180°

Time of Test: 4:20 PM

Approach Vertical Angles: 50°

FMH Serial No: 035

Additional Description:

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
522	471	12.7	24.0	34	0

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-94.1	1.47	1.47
Y	6	J35919	94.3	1.54	1.54
Z	7	J22664	92.7	1.18	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: Am J. Mac Approved By: [Signature] Date: 11/16/04

*Only necessary for NHTSA (Government) Compliance testing.

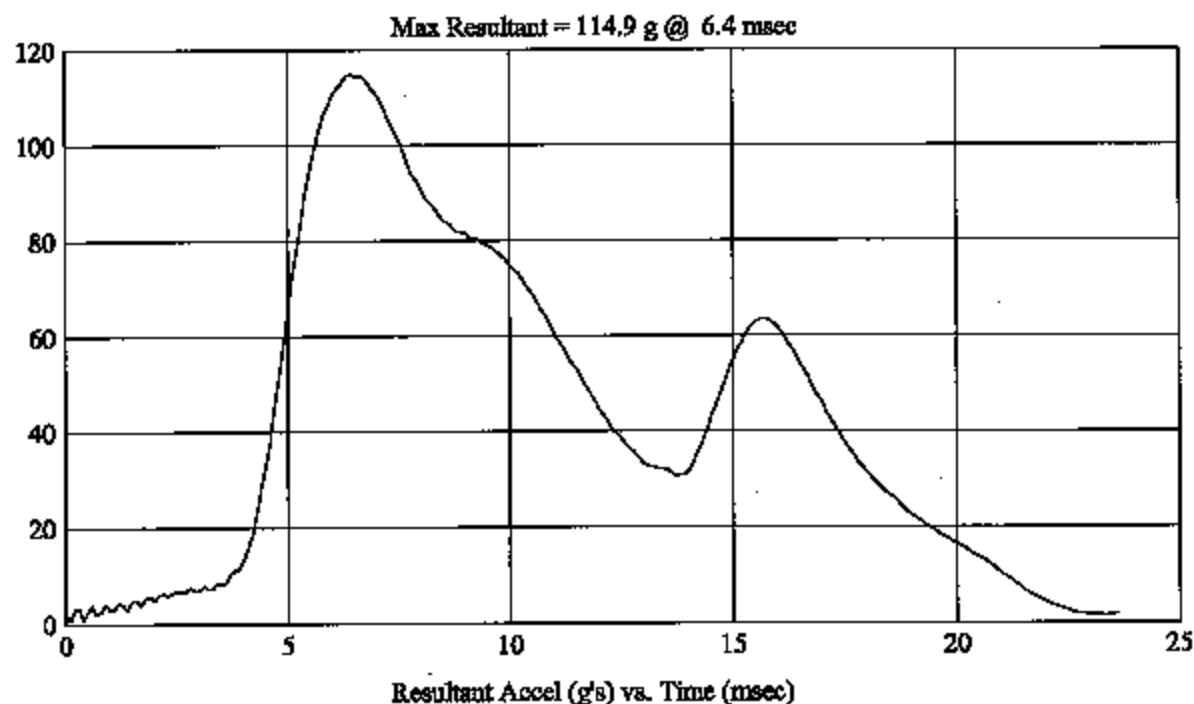
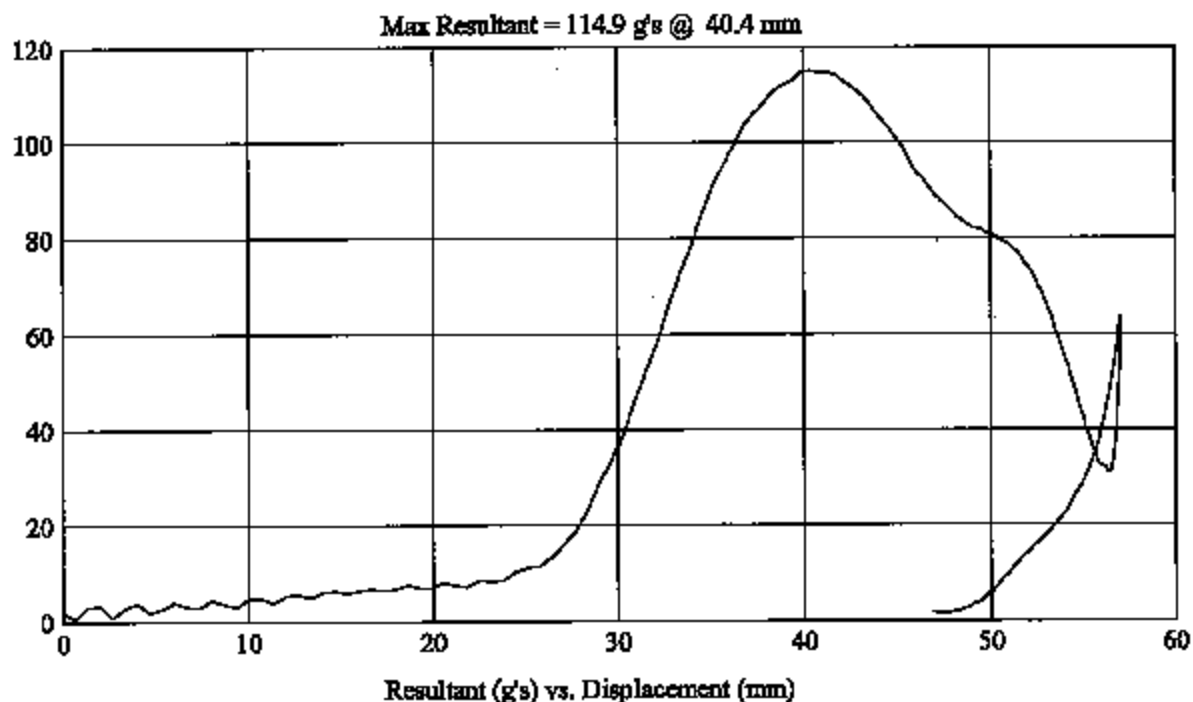
Customer: DODGE
Test# 5
FM4697
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: FH1
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 522, HIC = 471, Delta T = 12.7 msec



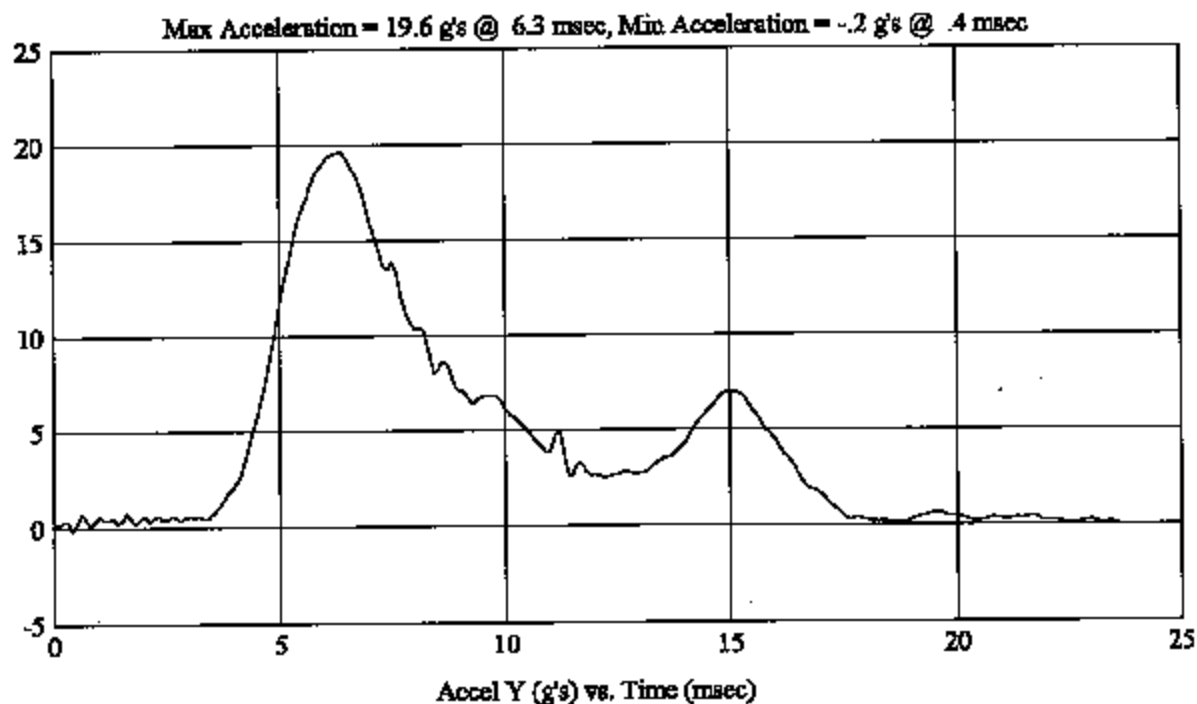
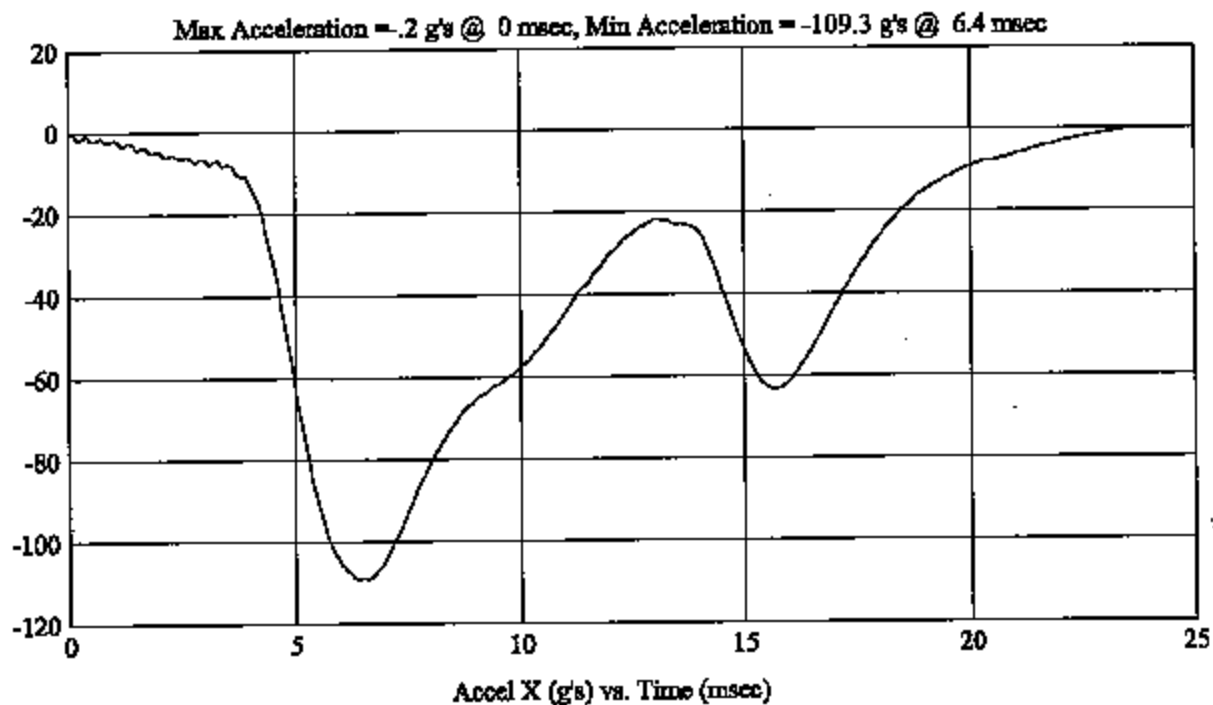
Customer: DODGE
Test # 5
FM4697
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: FH1
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 522, HIC = 471, Delta T = 12.7 msec



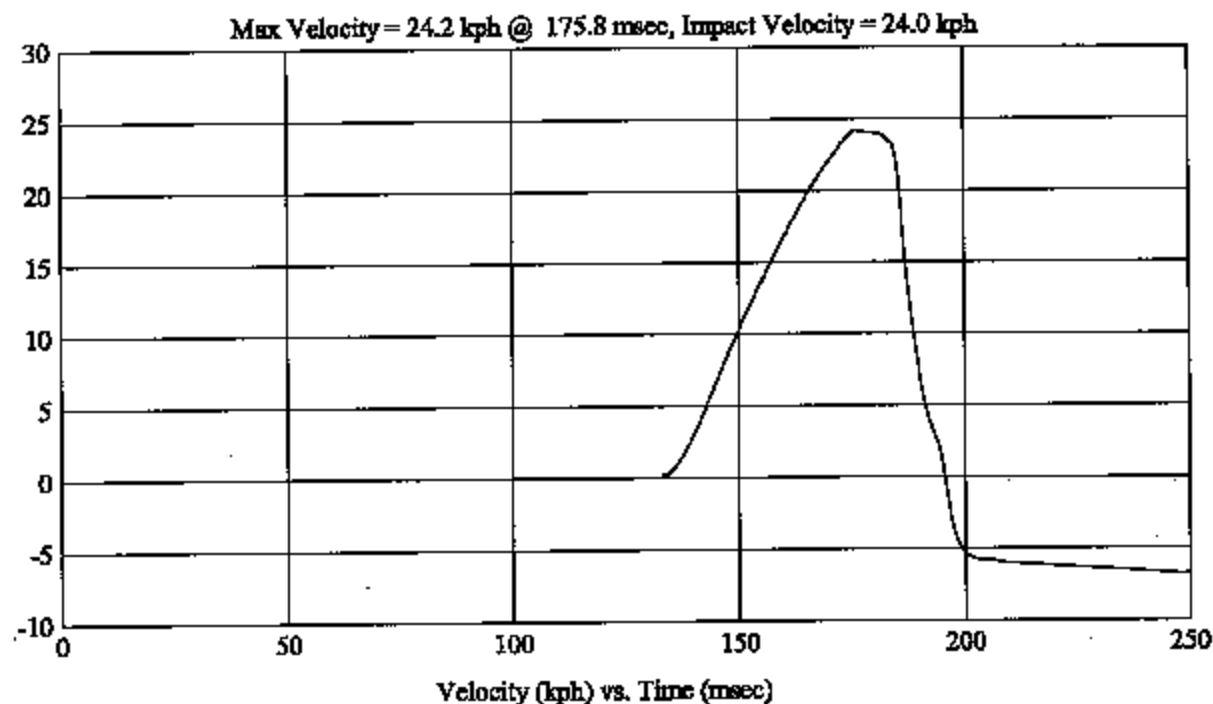
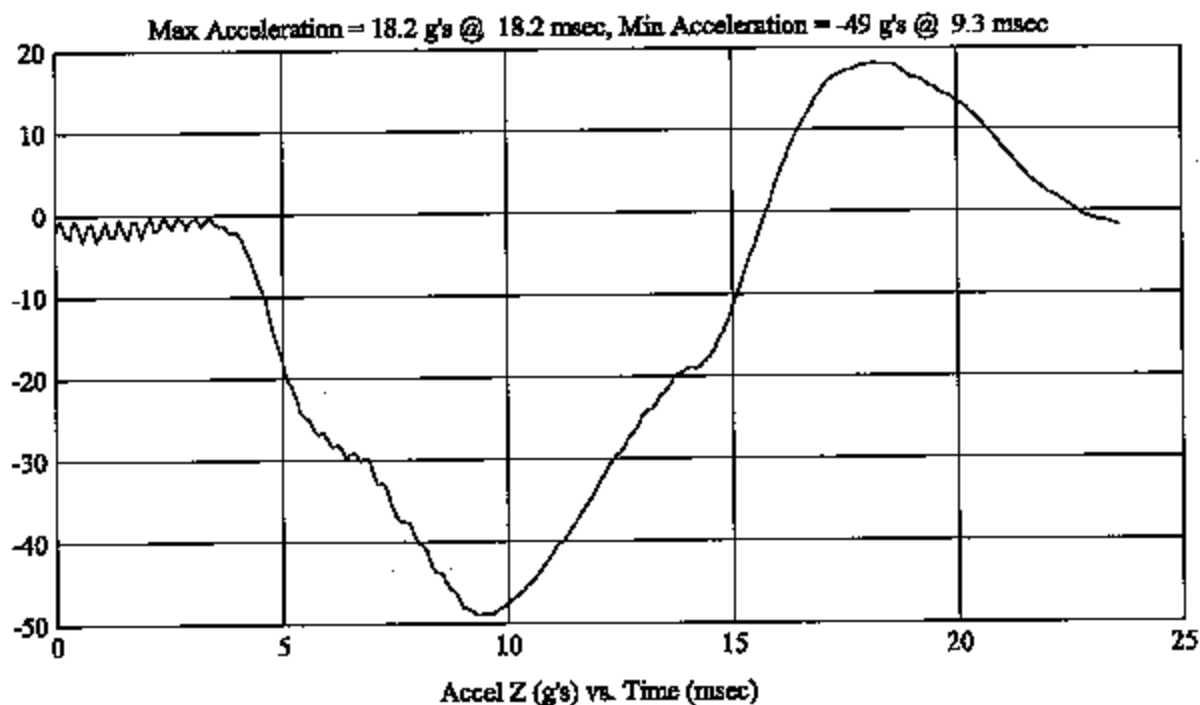
Customer: DODGE
Test # 5
FM4697
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: FH1
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 522, HIC = 471, Delta T = 12.7 msec



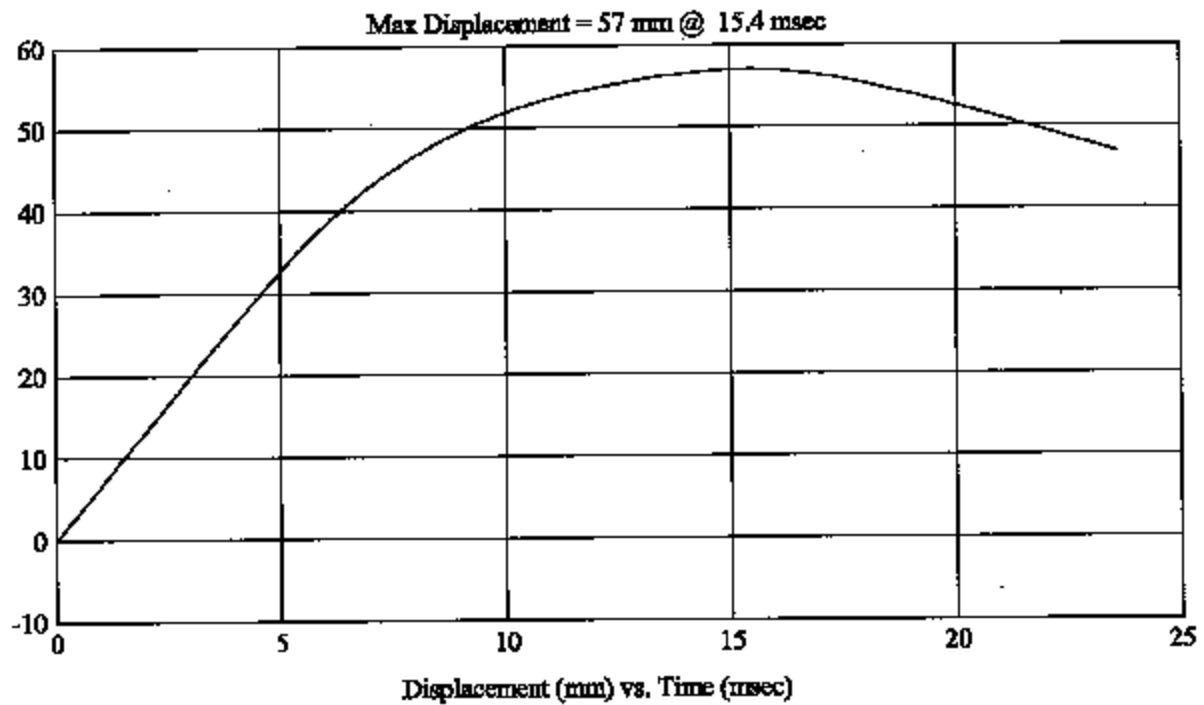
Customer: DODGE
Test # 5
FM4697
Additional Desc: N/A

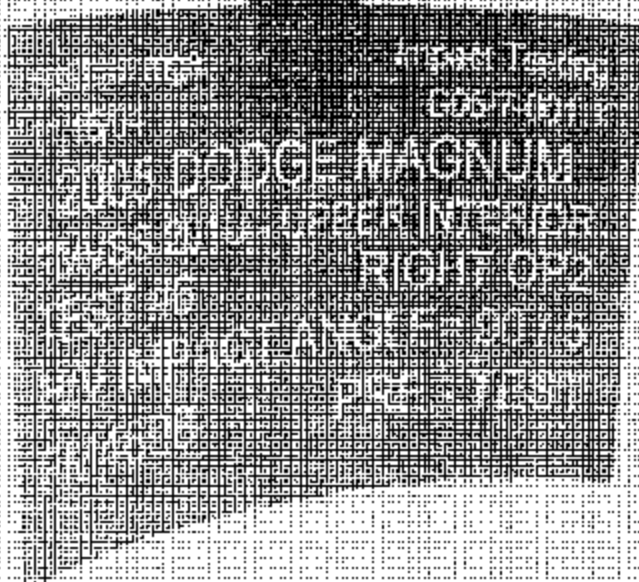
Vehicle Program : MAGNUM

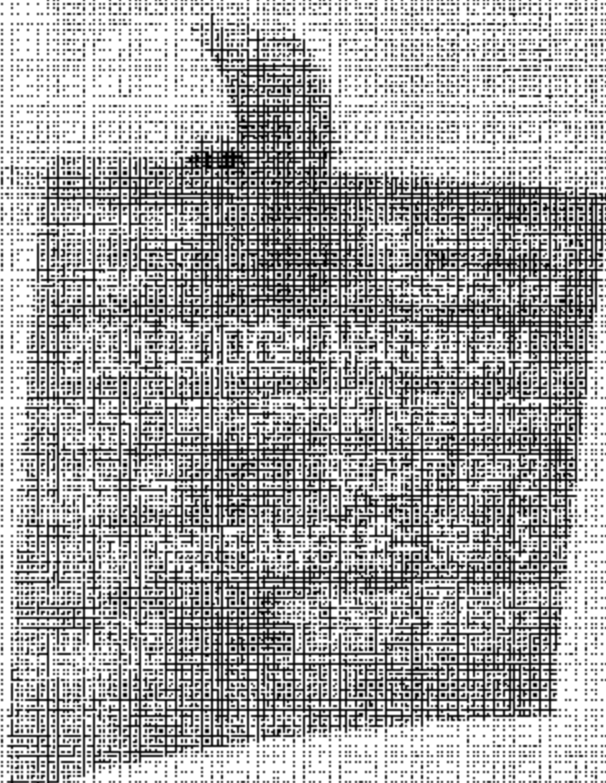
Test Date: 11/16/04

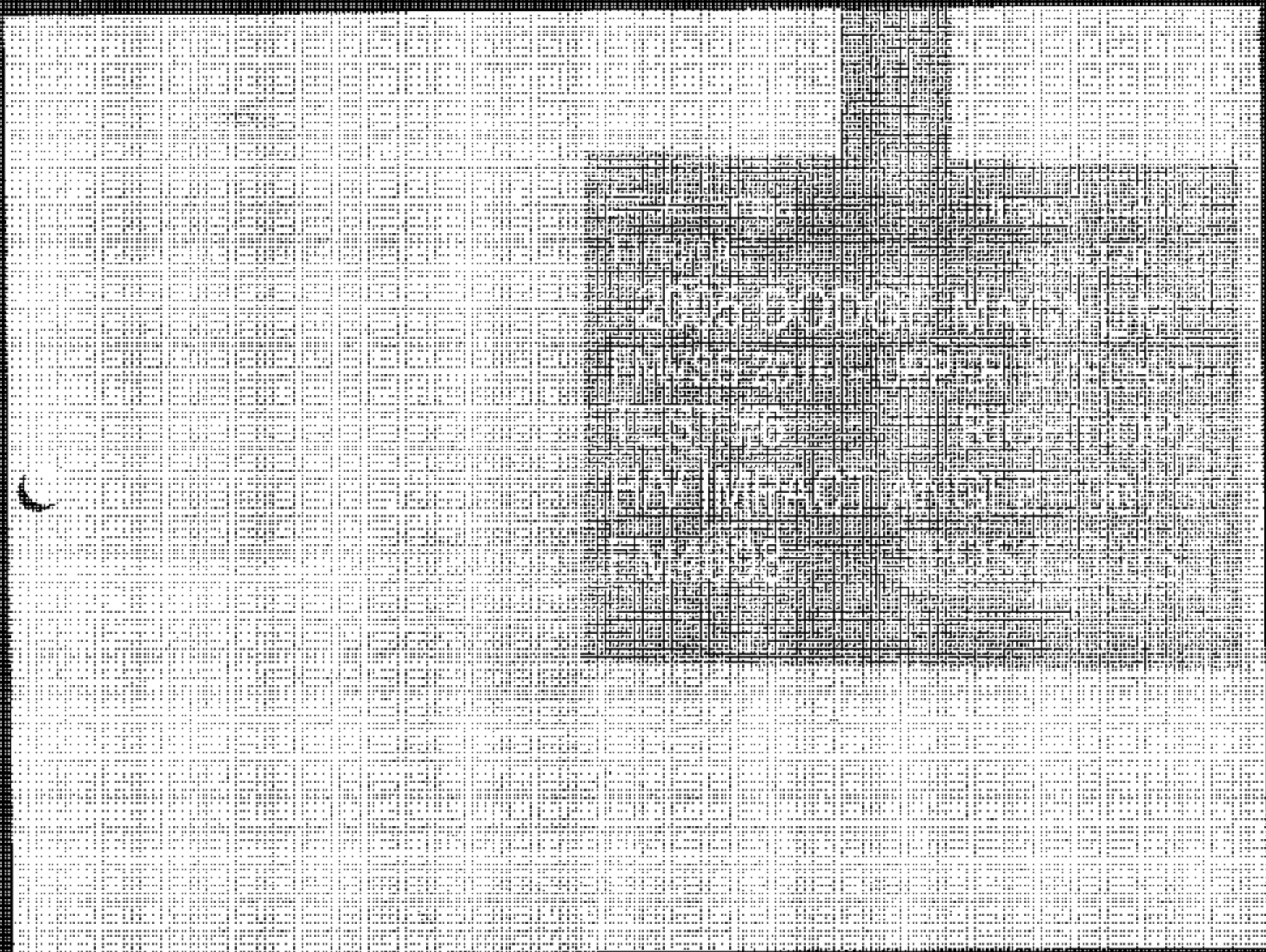
Model Year: 2005
Target: FH1
Vehicle Side: Right
Horz/Vert Angle: 180/50

HIC(d) = 522, HIC = 471, Delta T = 12.7 msec









MICHIGAN OPERATIONS
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): OP2 Right

MGA Test Reference No.: FM4698

Approach Horizontal Angles: 90°

Approach Vertical Angles: 5°

Additional Description:

Test Number: #6

Temperature: 25C

Humidity: 30%

Time of Test: 5:15 PM

FMH Serial No: 036

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
601	576	7	23.3	23	7 L

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-99.8	1.47	1.48
Y	6	J35916	99.7	1.54	1.54
Z	7	J35918	98.1	1.44	1.27

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By: [Signature] Date: 11/16/04

*Only necessary for NHTSA (Government) Compliance testing.

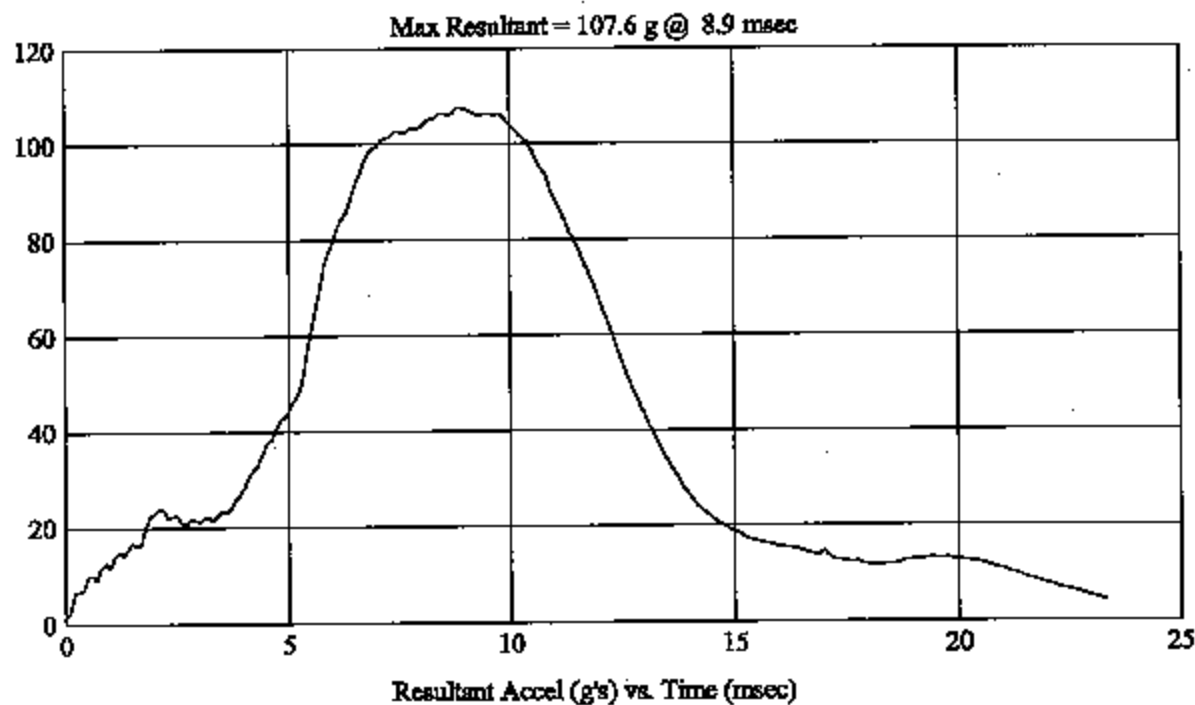
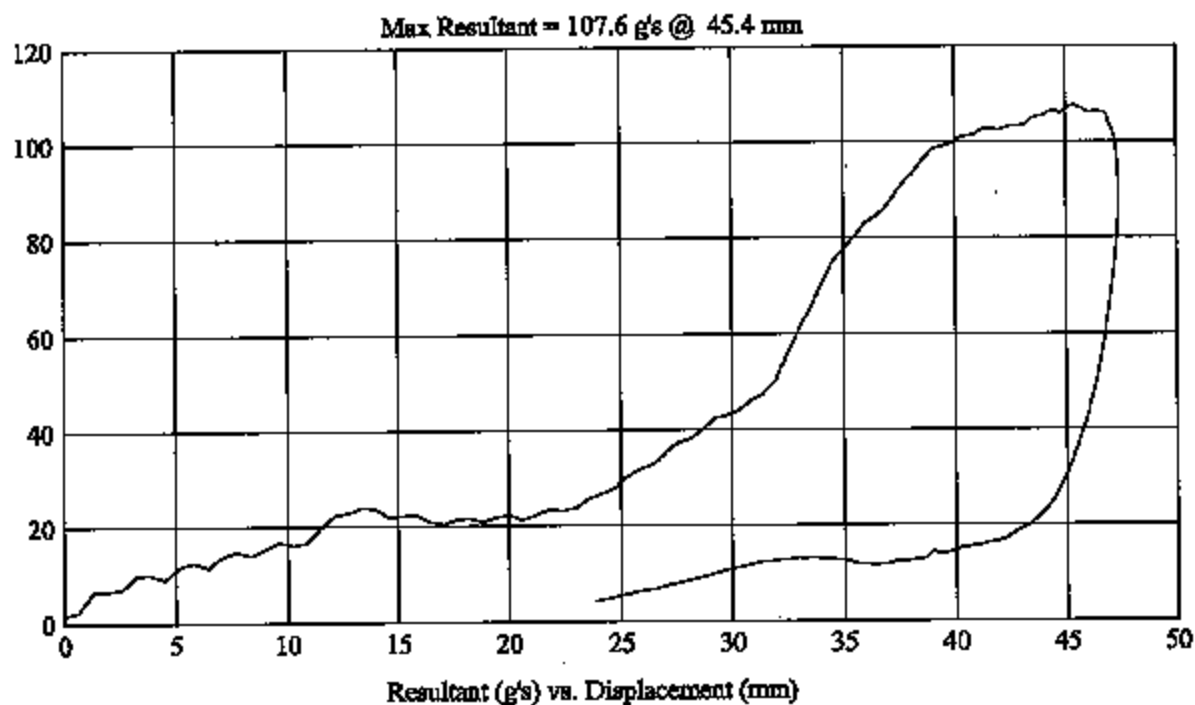
FMH
G05X7-001.1Customer: DODGE
Test # 6
FM4698
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: OP2
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 601, HIC = 576, Delta T = 7 msec



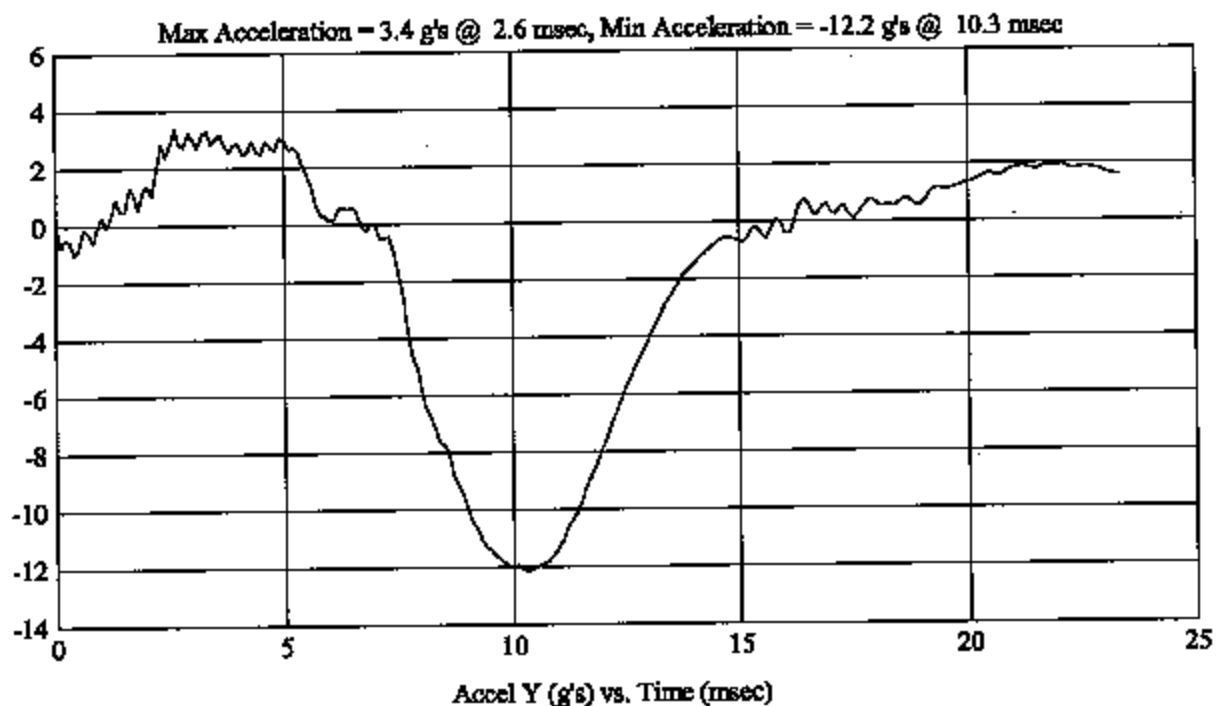
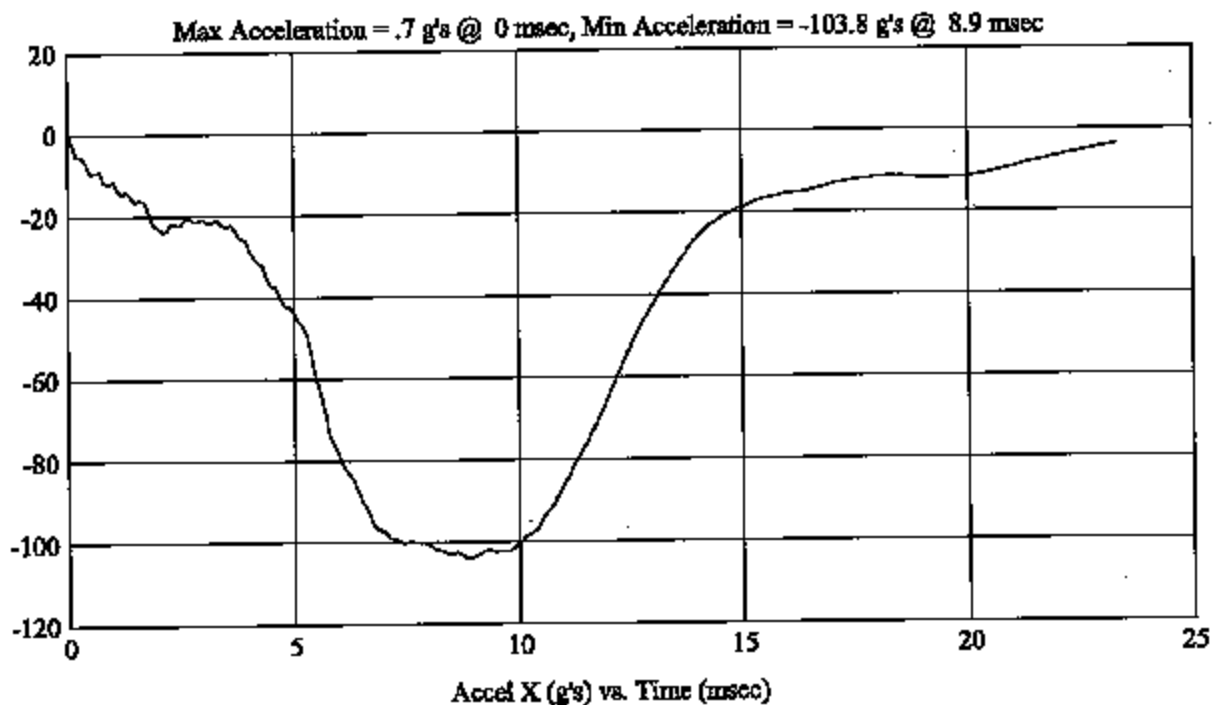
Customer: DODGE
Test # 6
FM4698
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: OP2
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(a) = 601, HIC = 576, Delta T = 7 msec



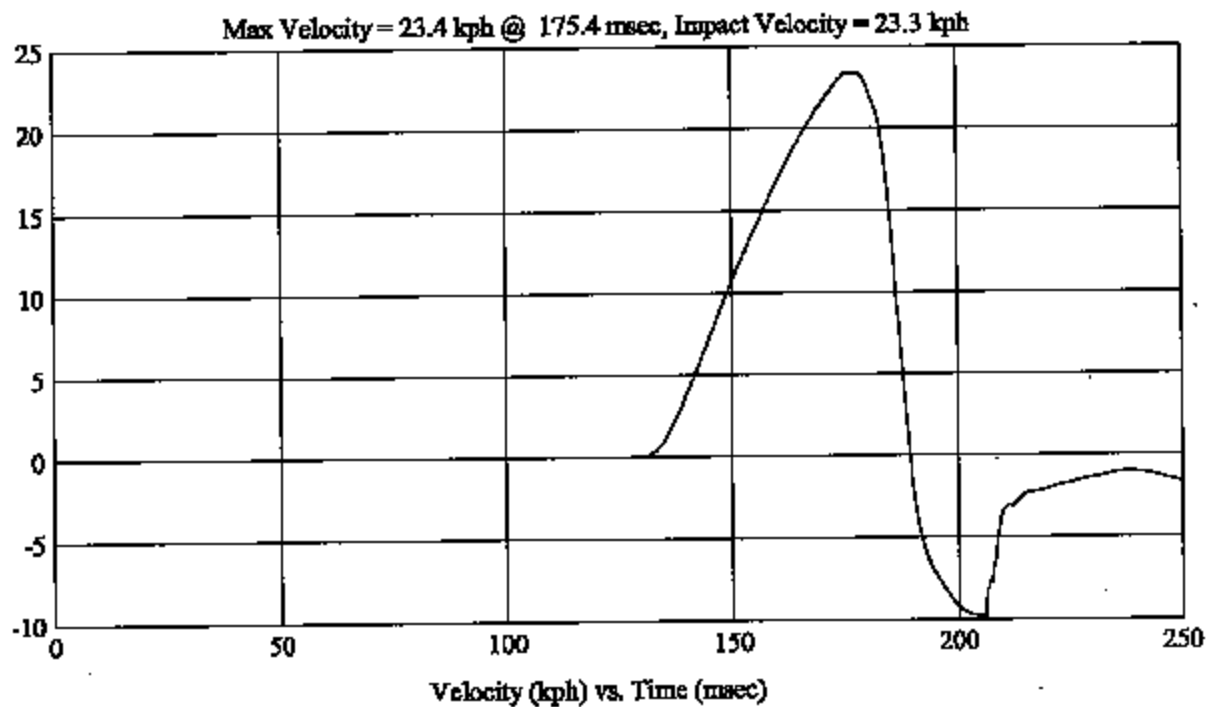
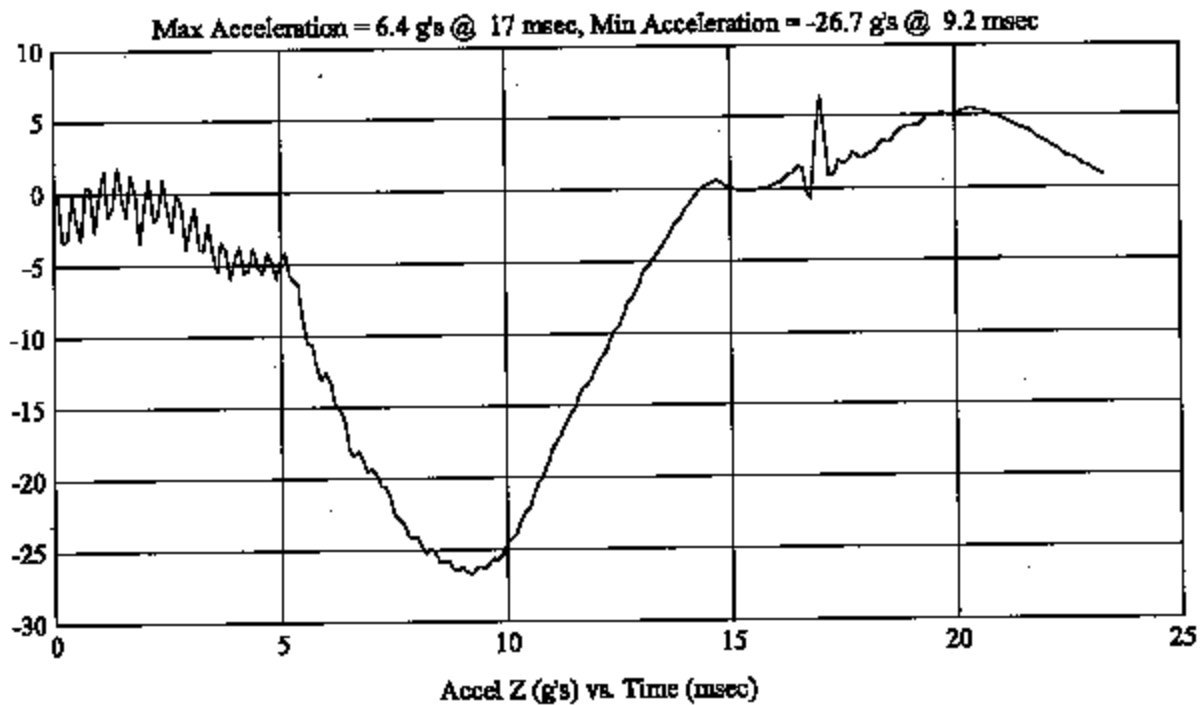
Customer: DODGE
Test # 6
FM4698
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: OP2
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 601, HIC = 576, Delta T = 7 msec

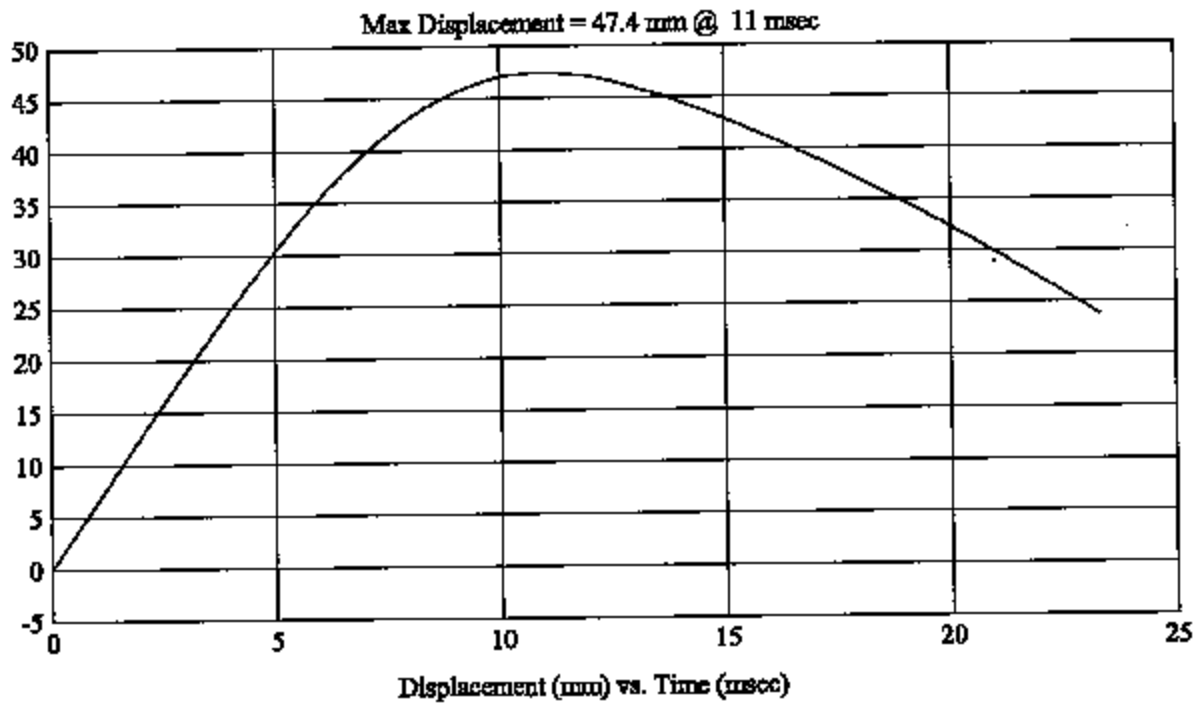


Customer: DODGE
Test # 6
FM4698
Additional Desc: N/A

Vehicle Program : MAGNUM
Test Date: 11/16/04

Model Year: 2005
Target: OP2
Vehicle Side: Right
Horz/Vert Angle: 90/5

HIC(d) = 601, HIC = 576, Delta T = 7 msec



2005 DODGE MAGNUM

10/10/04

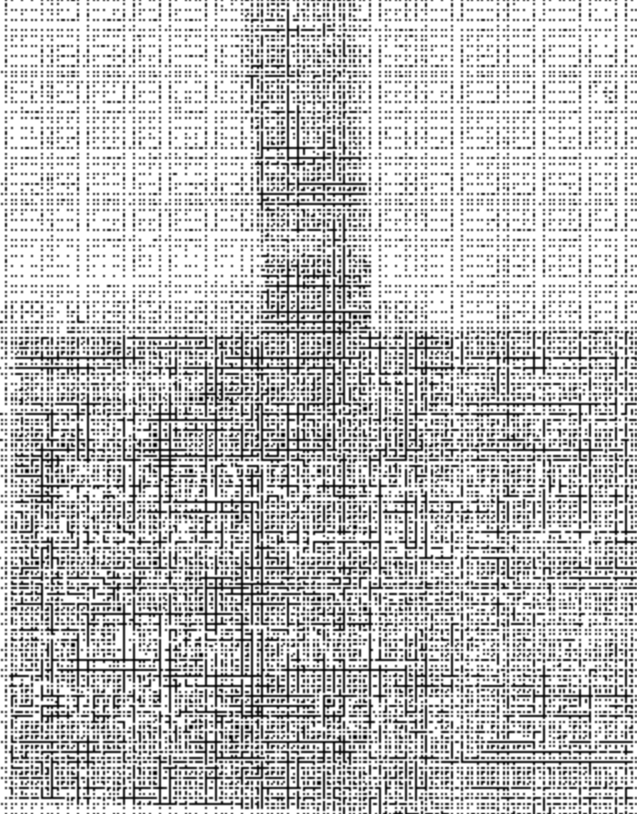
2005 DODGE MAGNUM

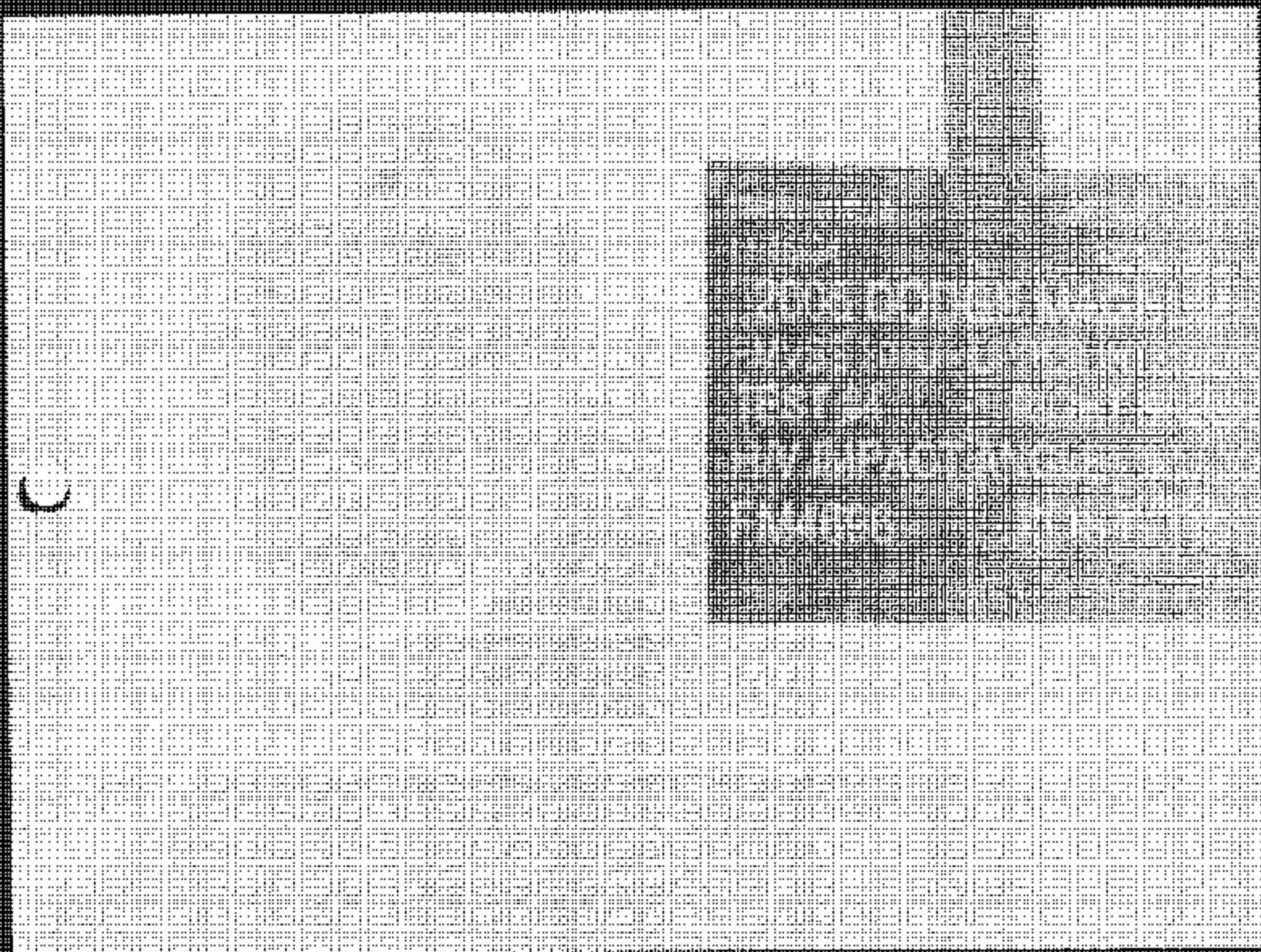
HMVSS 2011 UPPER INTERIOR

TEST #1 RIGHT SIDE

HV IMPACT AND DEFORMATION

PM4696 PREPARED





MICHIGAN OPERATIONS
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): SR2(b) Right

MGA Test Reference No.: FM4696

Approach Horizontal Angles: 90°

Approach Vertical Angles: 30°

Additional Description:

Test Number: #4

Temperature: 24C

Humidity: 30%

Time of Test: 2:50 PM

FMH Serial No: 038

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
543	499	8.7	24.2	15	3 L

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J36197	-110	1.47	1.47
Y	6	J36193	101.8	1.54	1.54
Z	7	J36353	98.7	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By: [Signature] Date: 11/16/04

*Only necessary for NHTSA (Government) Compliance testing.

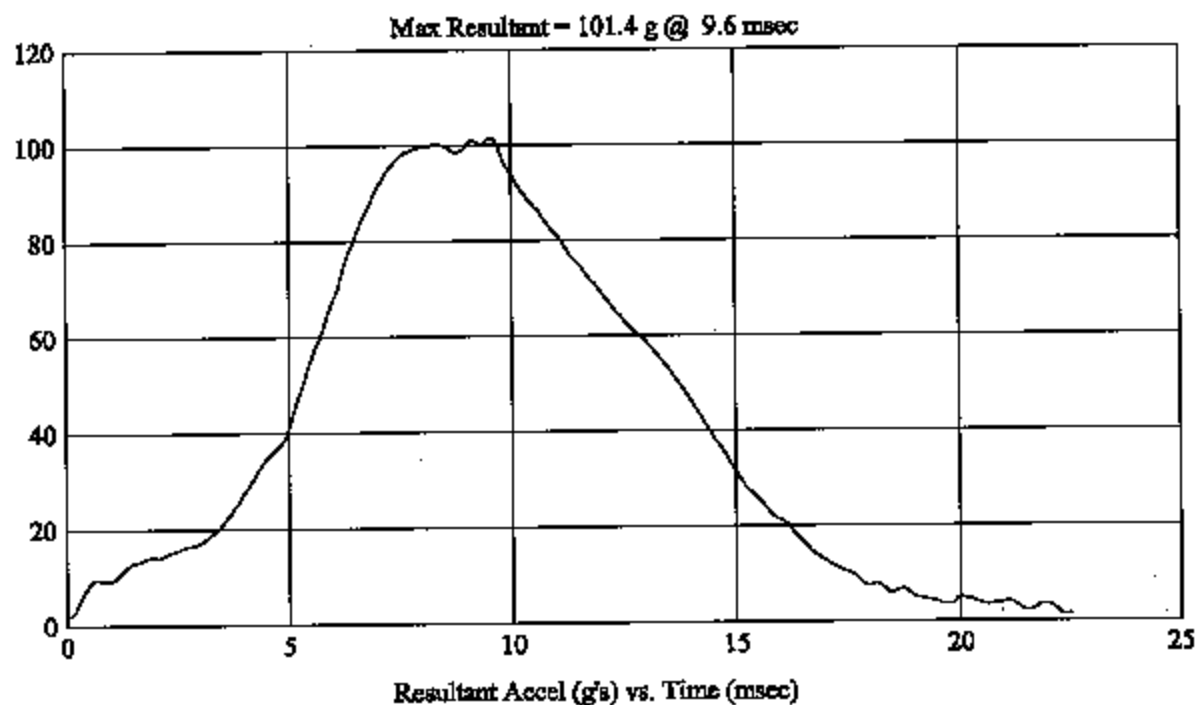
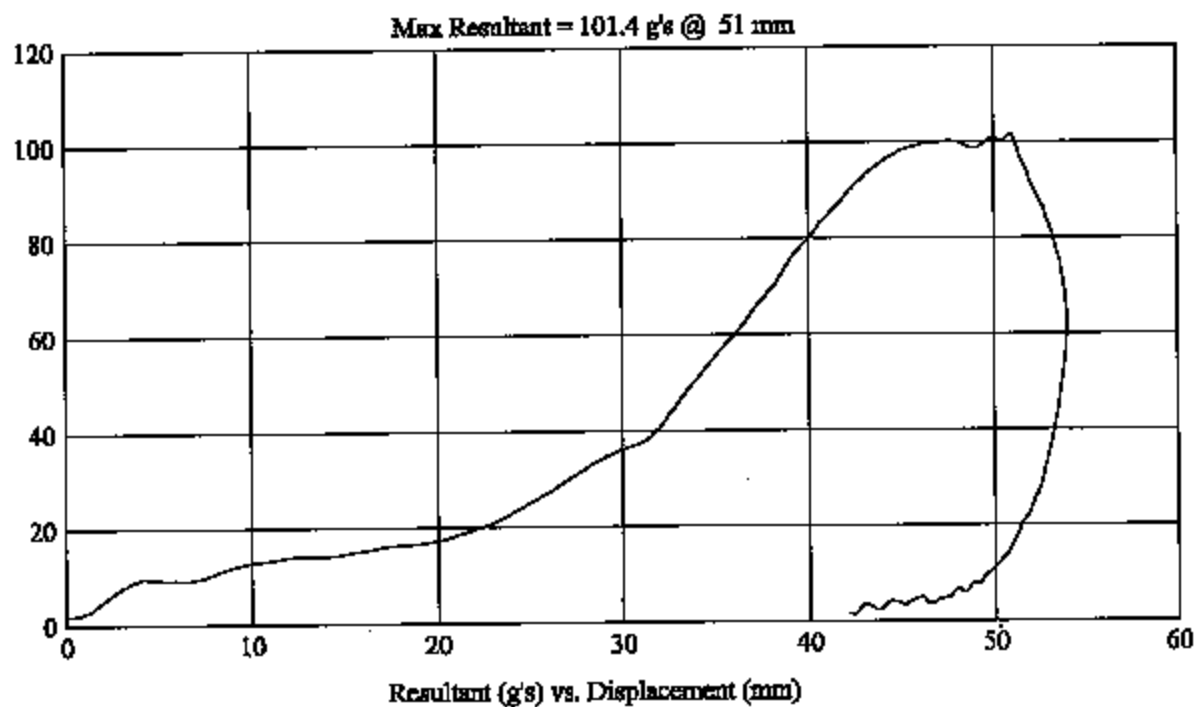
Customer: DODGE
Test # 4
FM4696
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/30

HIC(d) = 543, HIC = 499, Delta T = 8.7 msec

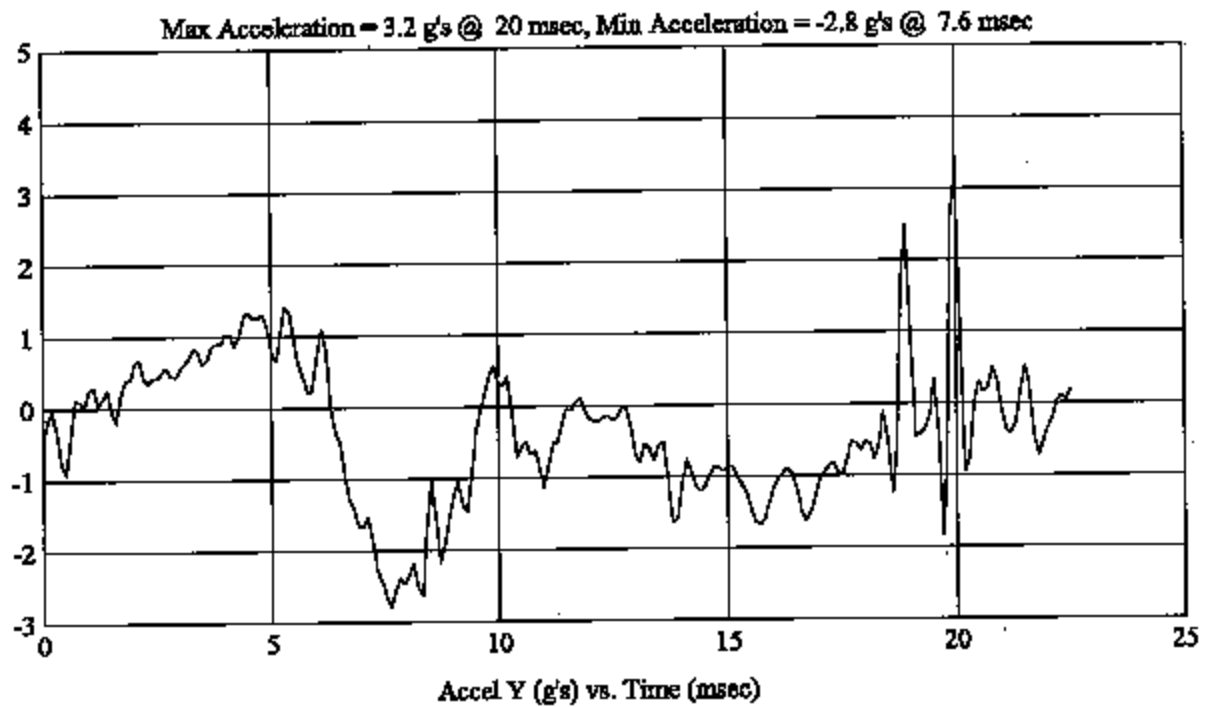
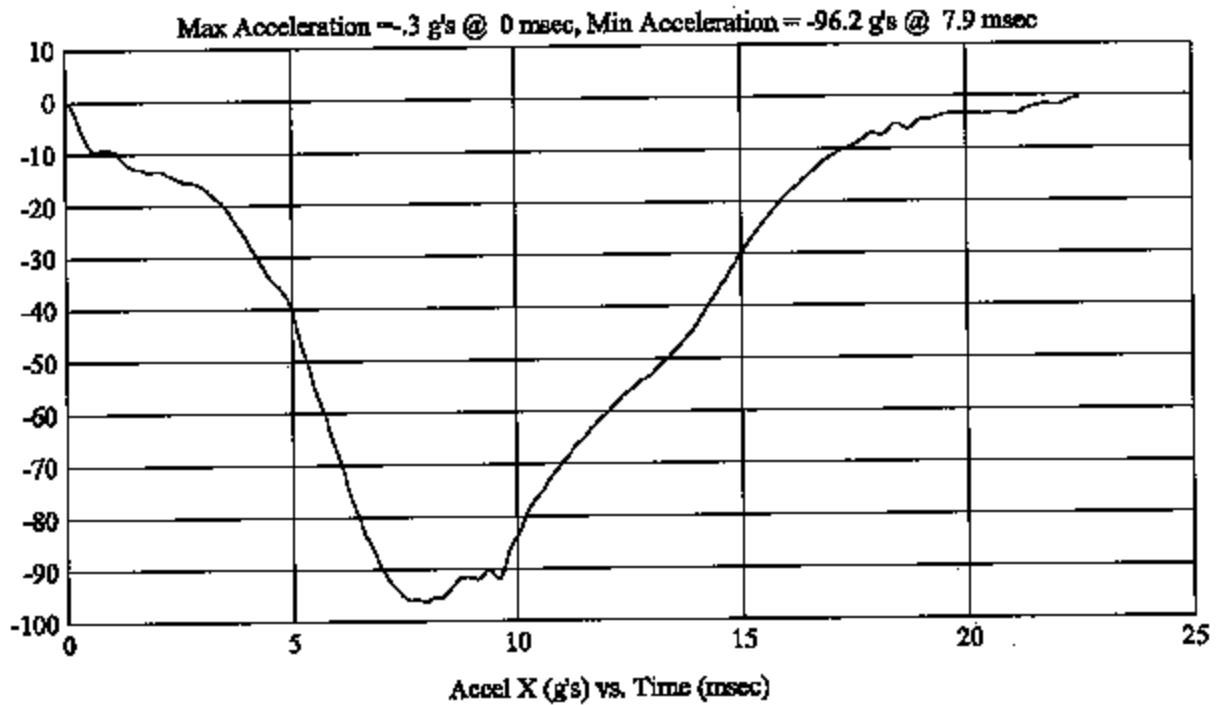


Customer: DODGE
Test # 4
FM4696
Additional Desc: N/A

Vehicle Program : MAGNUM
Test Date: 11/16/04

Model Year: 2005
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/30

HIC(d) = 543, HIC = 499, Delta T = 8.7 msec



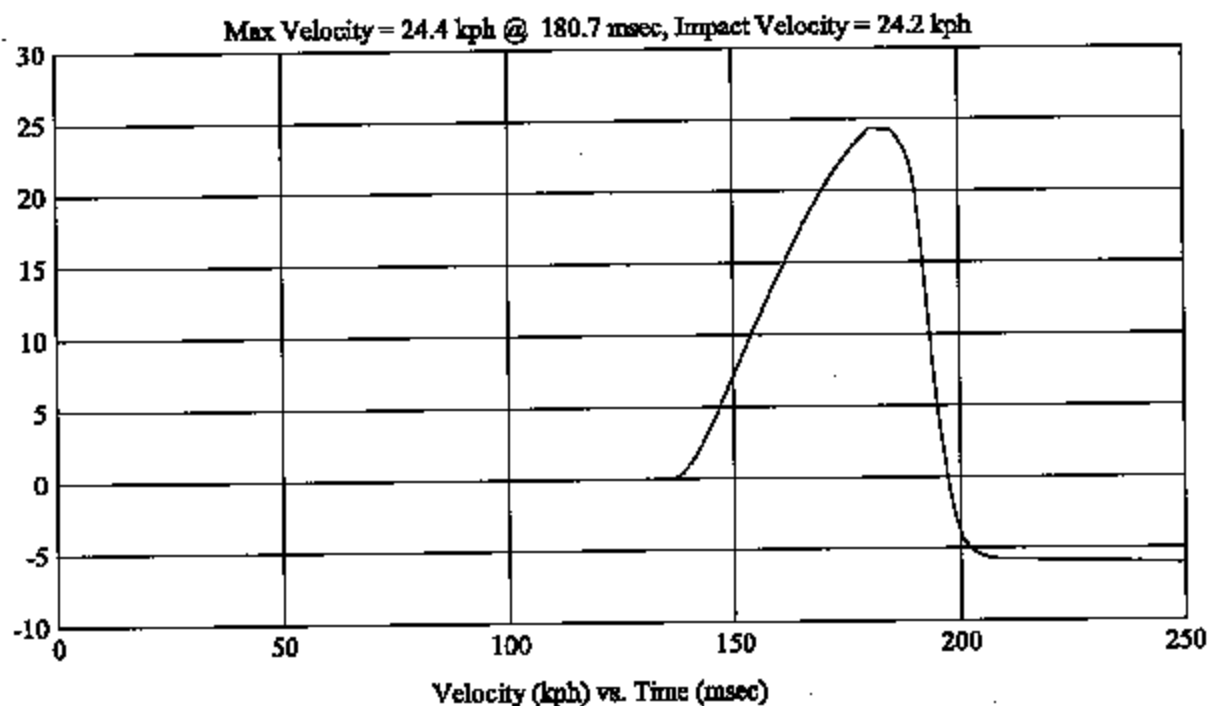
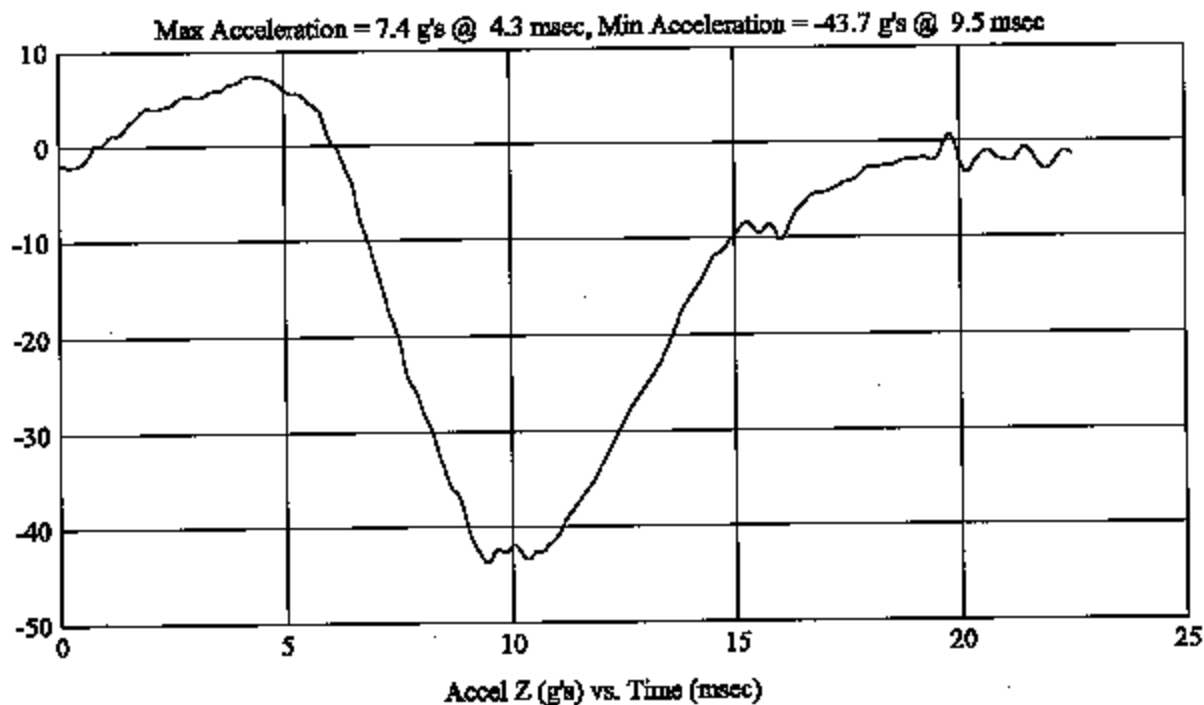
FMH
G05E7-001.1Customer: DODGE
Test # 4
FM4696
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/30

HIC(d) = 543, HIC = 499, Delta T = 8.7 msec



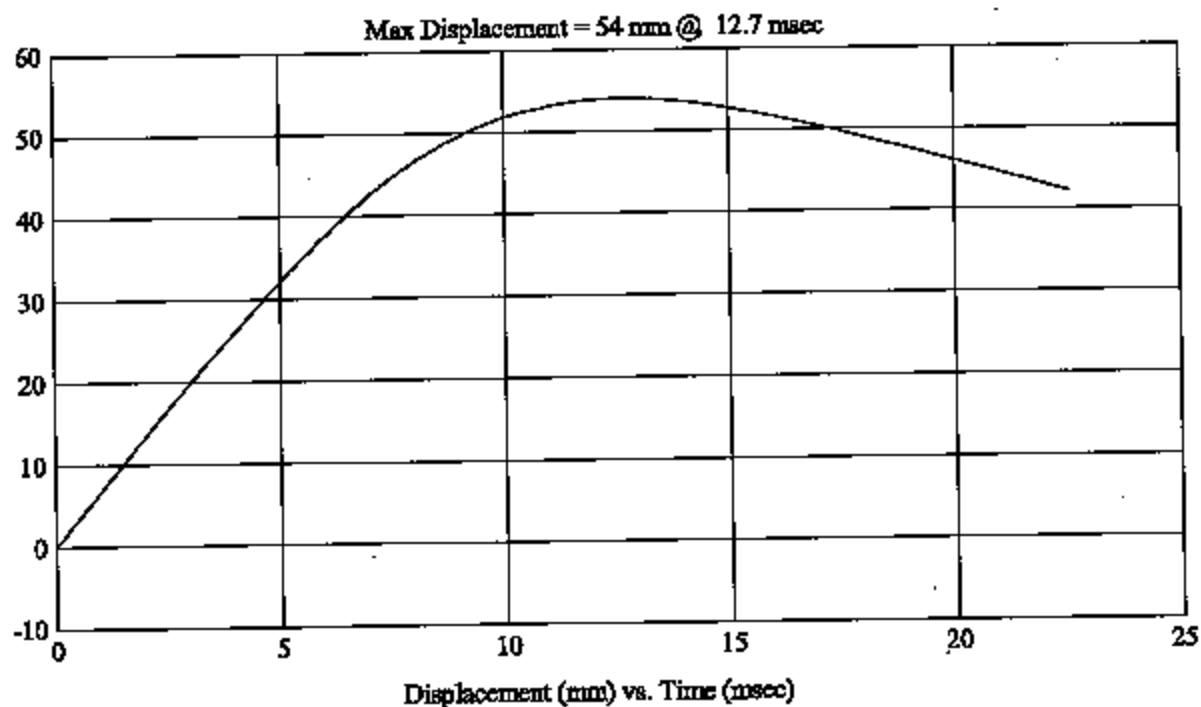
FMH
G0517-001.1Customer: DODGE
Test # 4
FM4696
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: SR2(b)
Vehicle Side: Right
Horz/Vert Angle: 90/30

HIC(d) = 543, HIC = 499, Delta T = 8.7 msec



FORD MOTOR COMPANY

FM4704

IMPACT TESTING

60510011

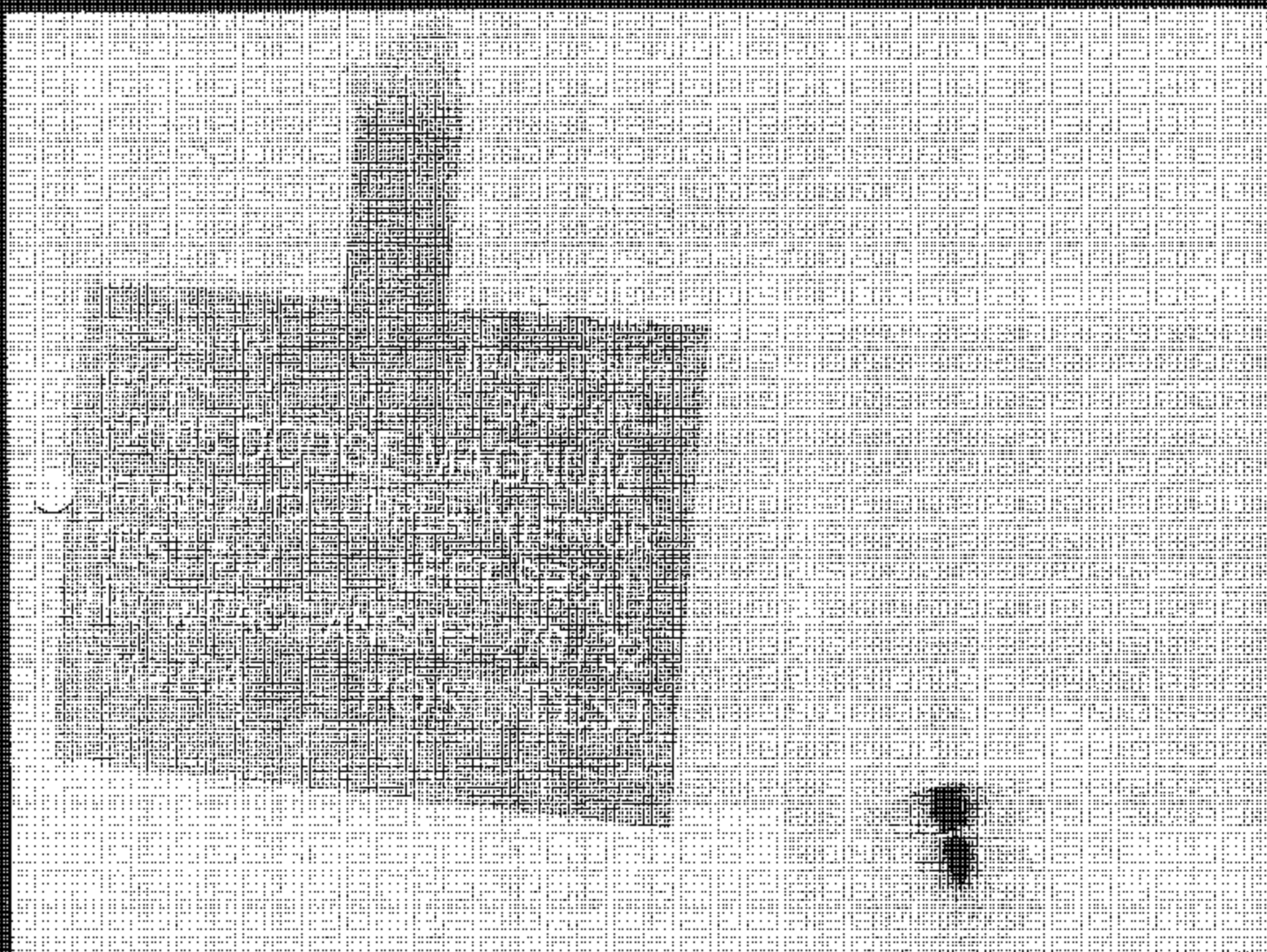
2005 DODGE MAGNUM

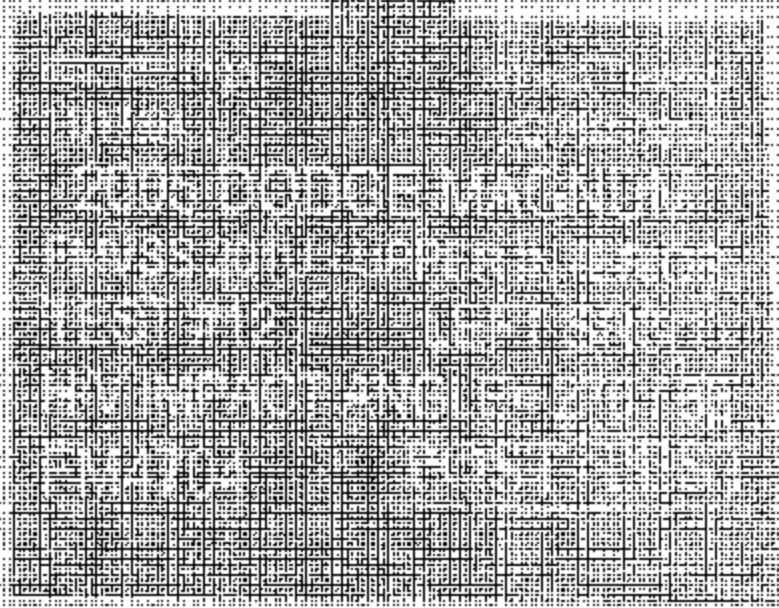
FMVSS 2010 - UPPER INTERIOR

TEST #12 LEFT SR3(1)

H/V IMPACT ANGLE - 270 / 32

FM4704 PRE - TEST





MICHIGAN OPERATIONS
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): SR3(1) Left

MGA Test Reference No.: FM4704

Approach Horizontal Angles: 270°

Approach Vertical Angles: 32°

Additional Description:

Test Number: #12

Temperature: 24C

Humidity: 37%

Time of Test: 5:00 PM

FMH Serial No: 036

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
461	391	7.7	23.5	20	2 L

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7284-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35923	-99.8	1.47	1.47
Y	6	J35916	99.7	1.54	1.54
Z	7	J35918	98.1	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By: [Signature] Date: 11/17/04

*Only necessary for NHTSA (Government) Compliance testing.

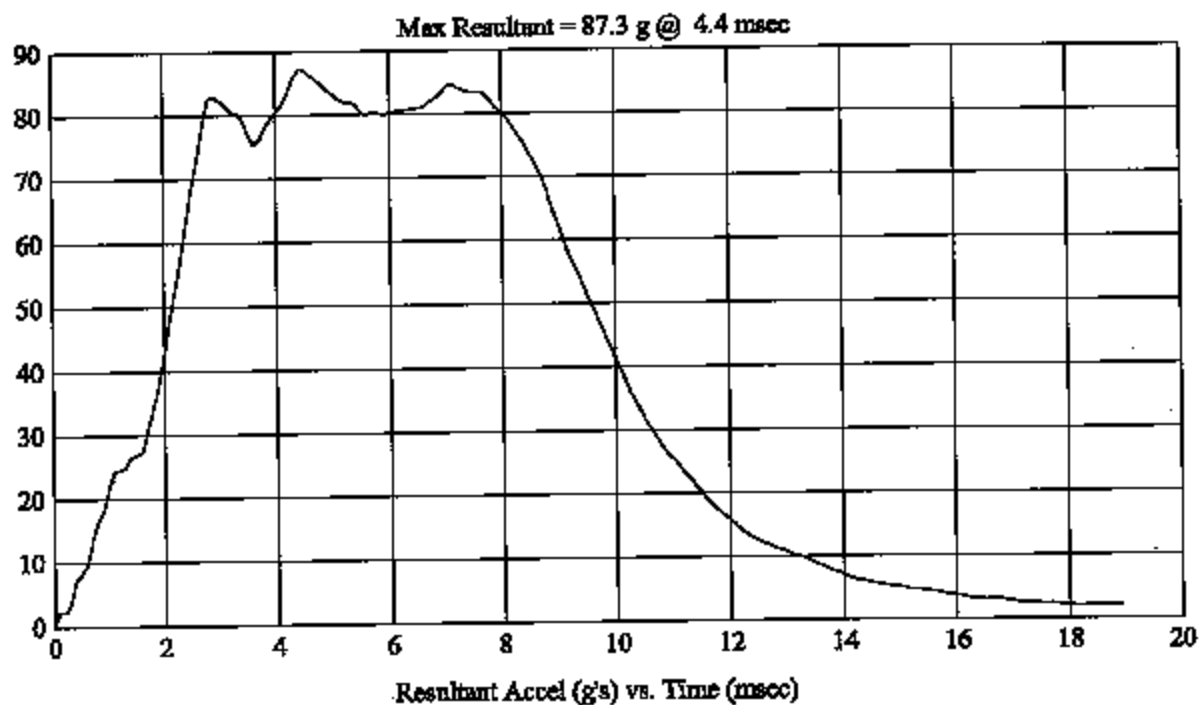
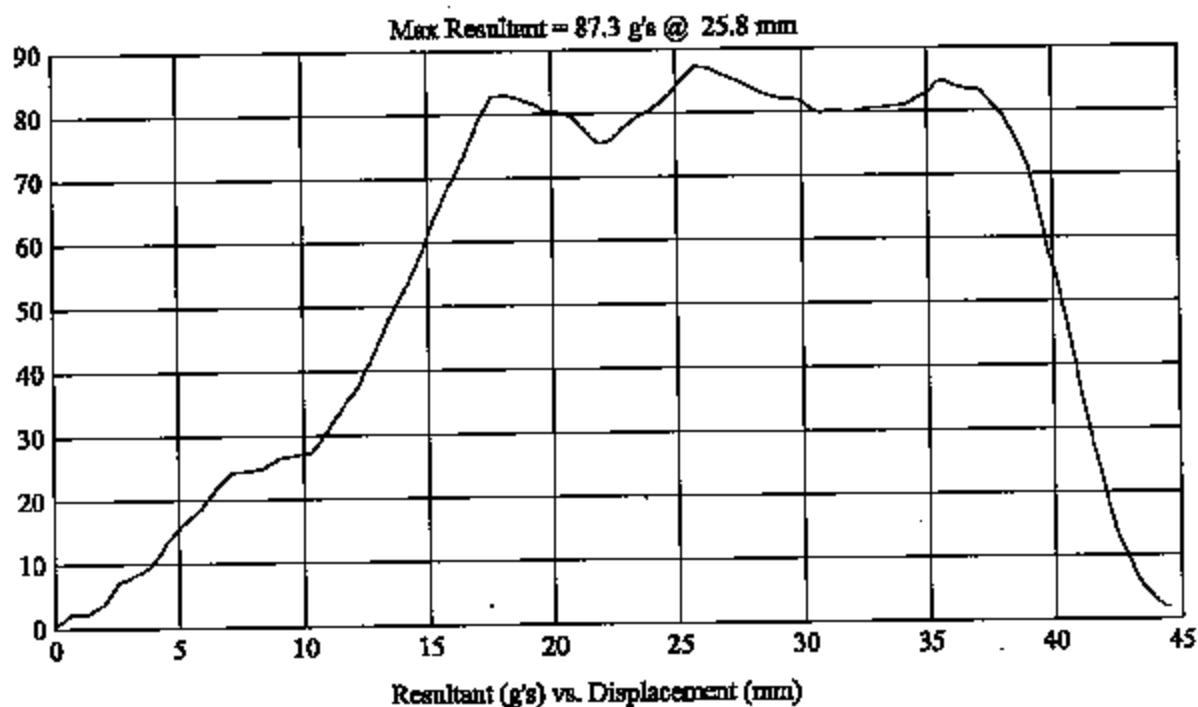
Customer: DODGE
Test # 12
FM4704
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/32

HIC(d) = 461, HIC = 391, Delta T = 7.7 msec



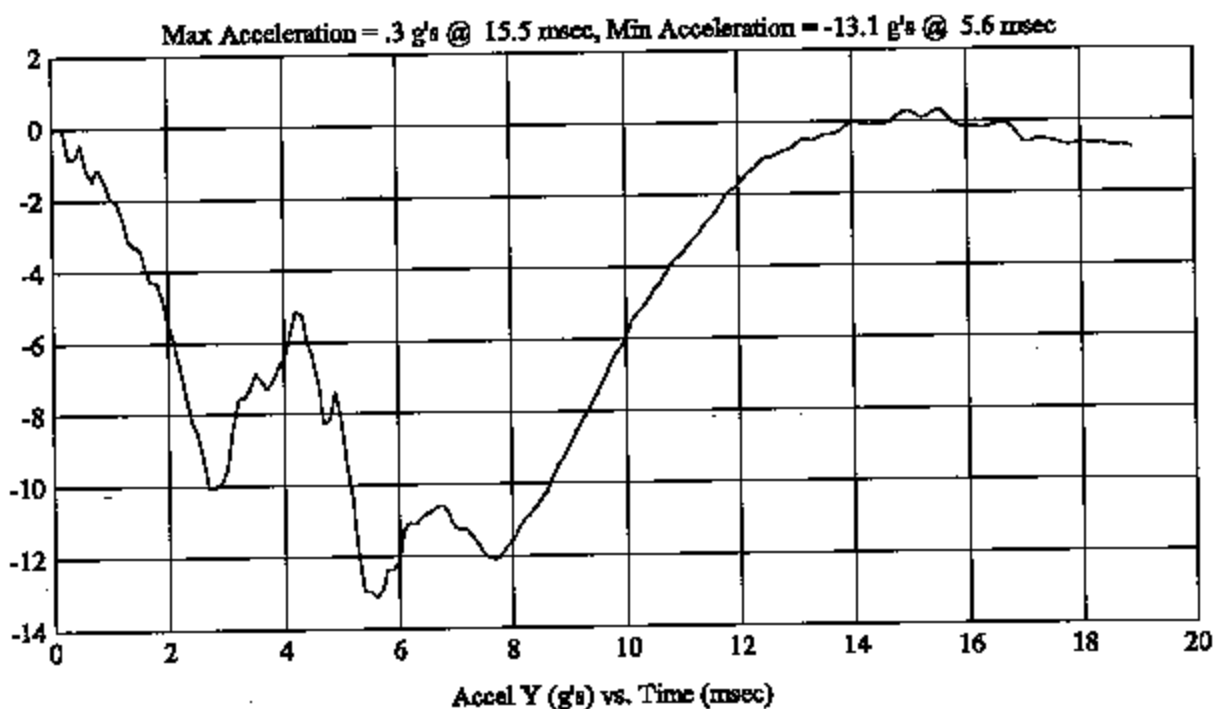
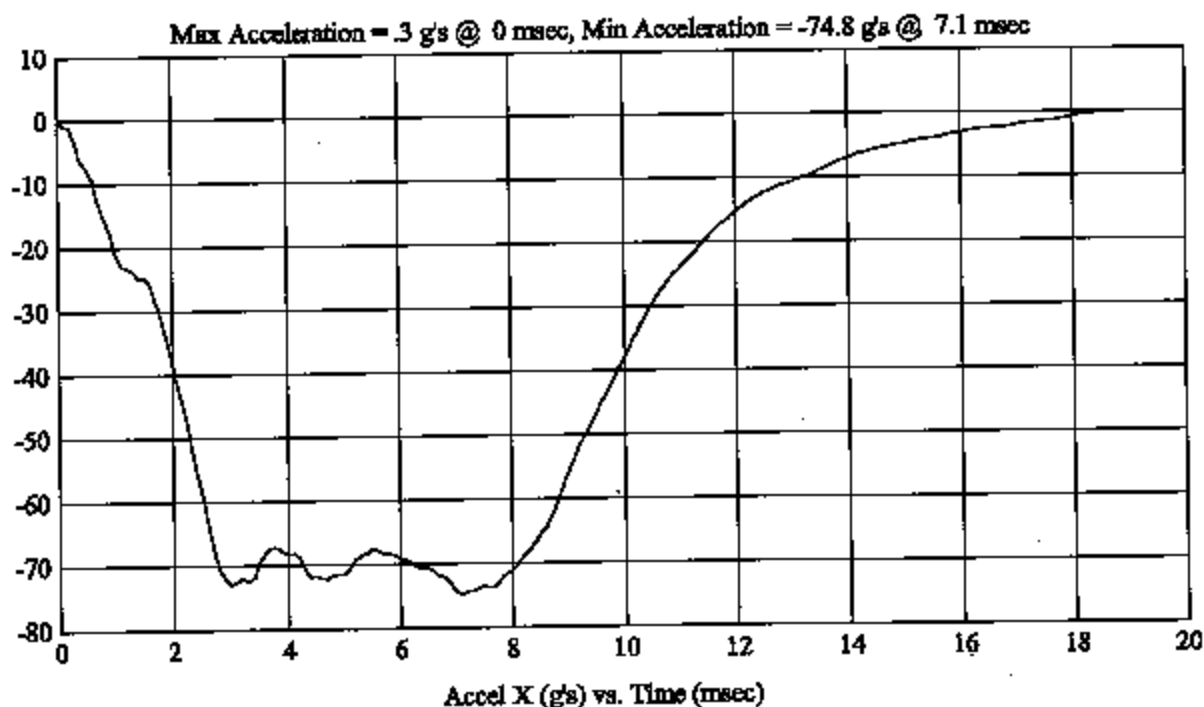
Customer: DODGE
Test# 12
FM4704
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/32

HIC(d) = 461, HIC = 391, Delta T = 7.7 msec



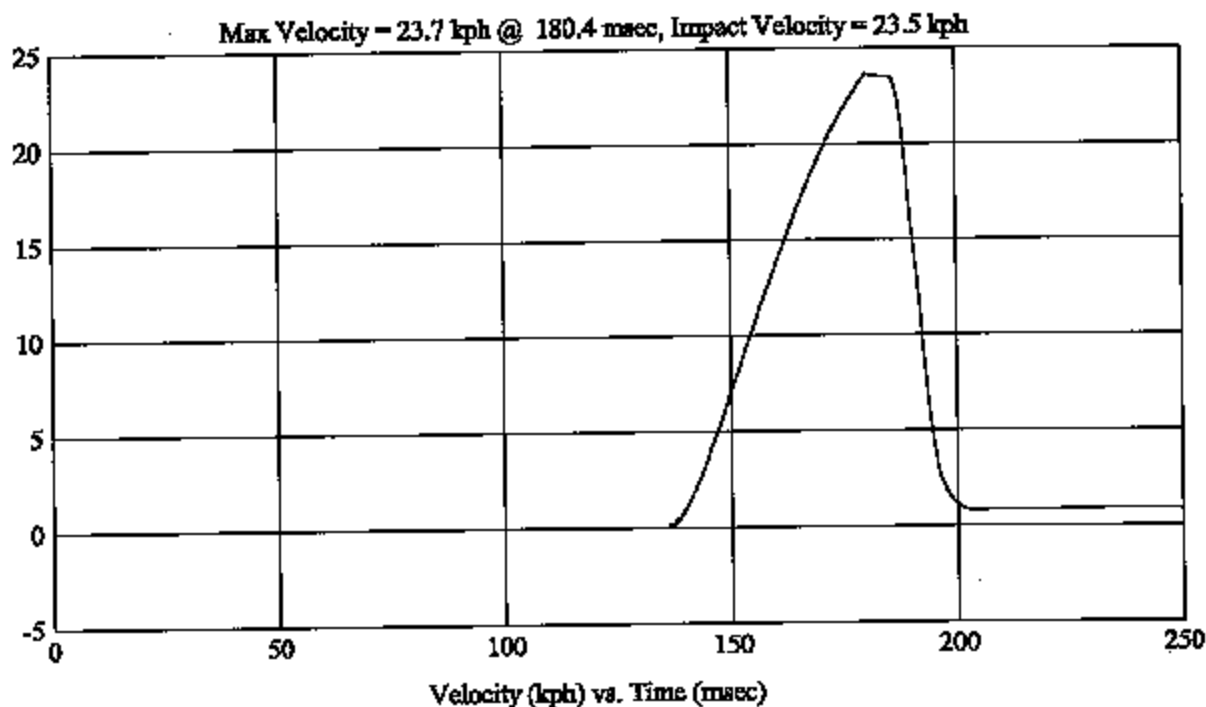
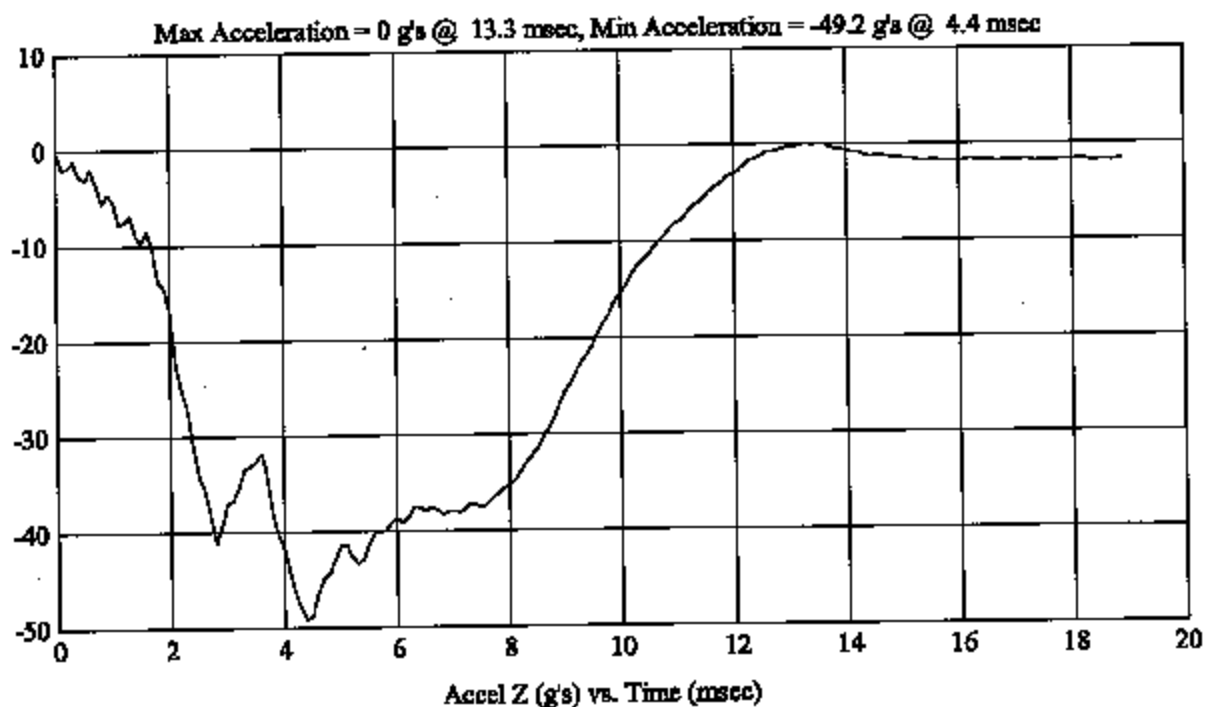
Customer: DODGE
Test # 12
FM4704
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/32

HIC(d) = 461, HIC = 391, Delta T = 7.7 msec



FMH
G05I7-001.1

3-72

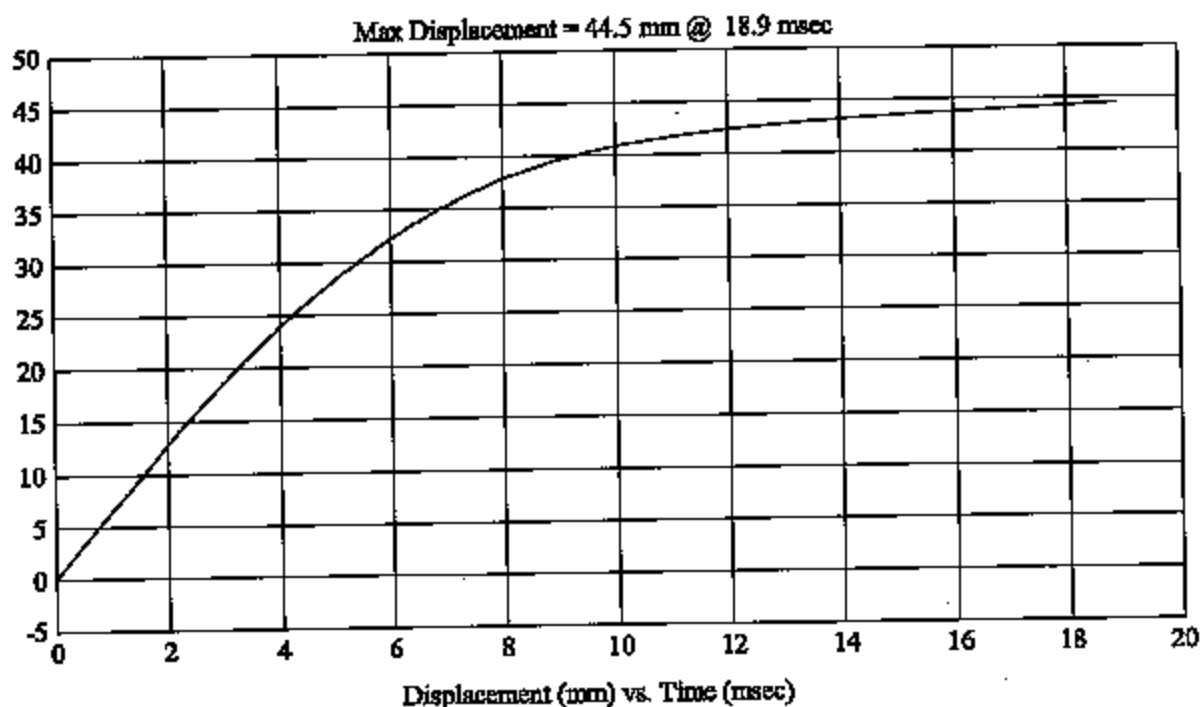
Customer: DODGE
Test # 12
FM4704
Additional Desc: N/A

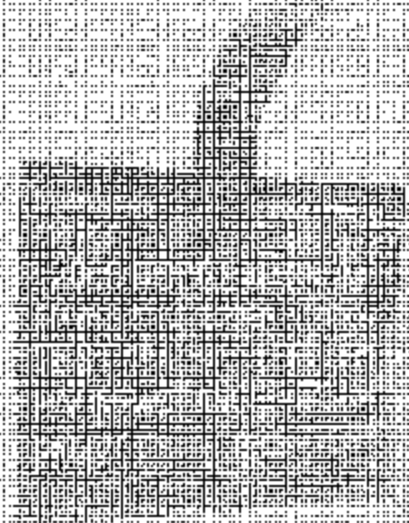
Vehicle Program : MAGNUM

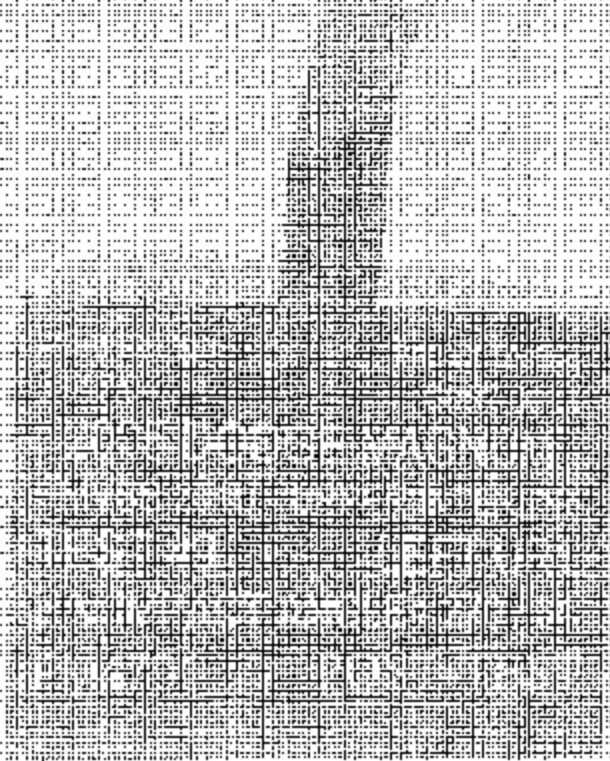
Test Date: 11/17/04

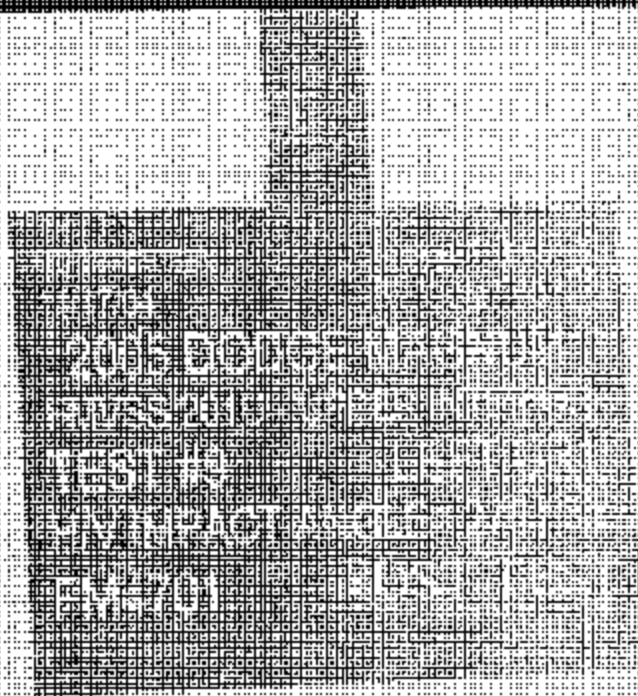
Model Year: 2005
Target: SR3(1)
Vehicle Side: Left
Horz/Vert Angle: 270/32

HIC(d) = 461, HIC = 391, Delta T = 7.7 msec









MICHIGAN OPERATIONS
DATE: 2/8/01
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DOC. NO.: MGATP207210.3
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR1 Left

MGA Test Reference No.: FM4701

Approach Horizontal Angles: 270°

Approach Vertical Angles: 34°

Additional Description:

Test Number: #9

Temperature: 24C

Humidity: 38%

Time of Test: 2:30 PM

FMH Serial No: 037

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
419	335	14.2	23.9	50	7L

INSTRUMENTAION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35800	-98.4	1.47	1.47
Y	8	J35841	92.6	1.54	1.54
Z	7	J35791	88.8	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: [Signature] Approved By*: [Signature] Date: 11/17/04
*Only necessary for NHTSA (Government) Compliance testing.

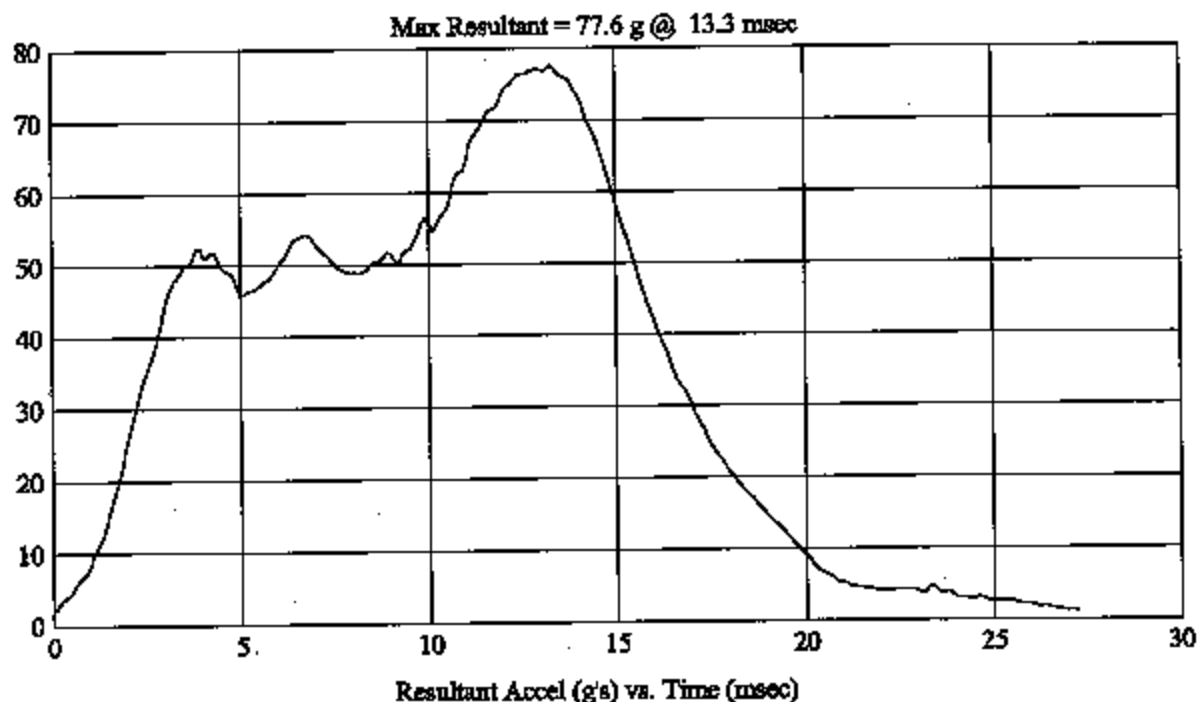
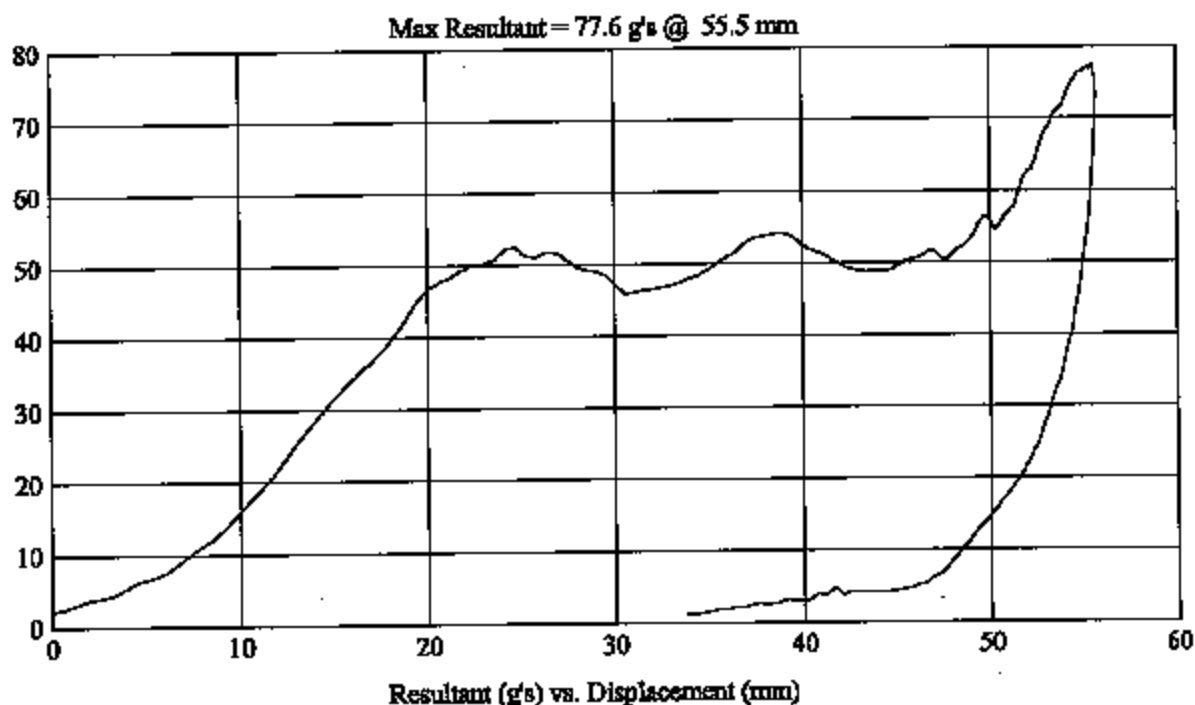
FMH
G05I7-001.1Customer: DODGE
Test # 9
FM4701
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/34

HIC(d) = 419, HIC = 335, Delta T = 14.2 msec



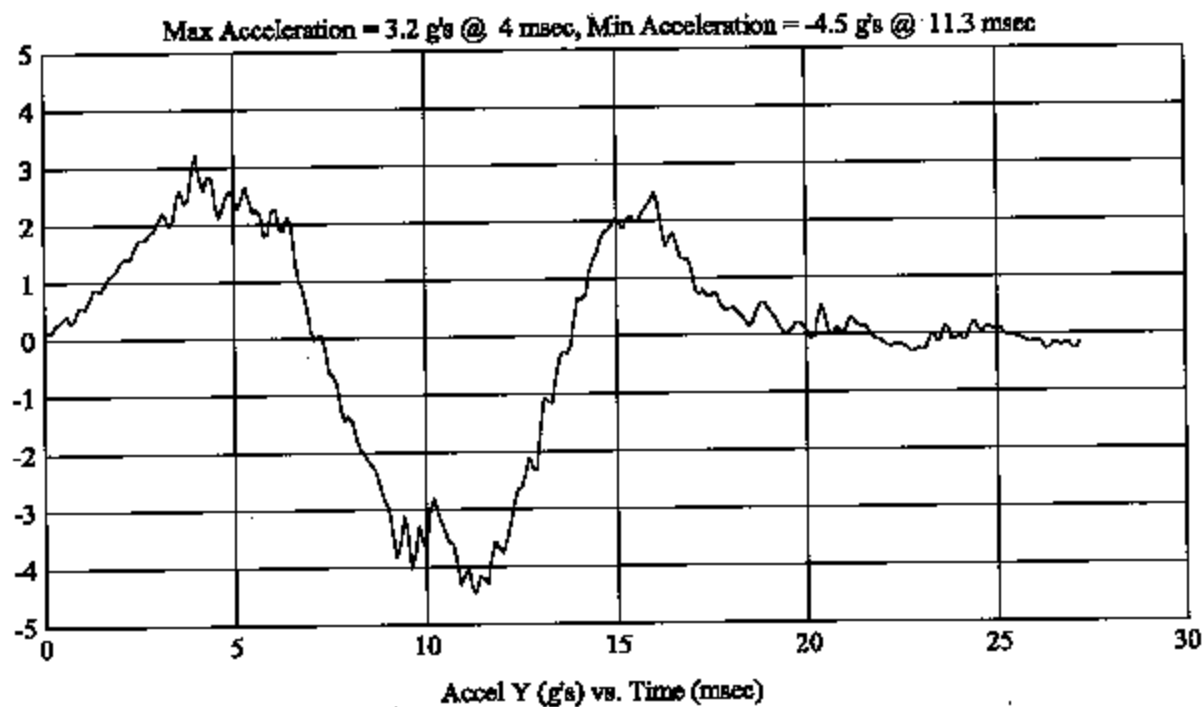
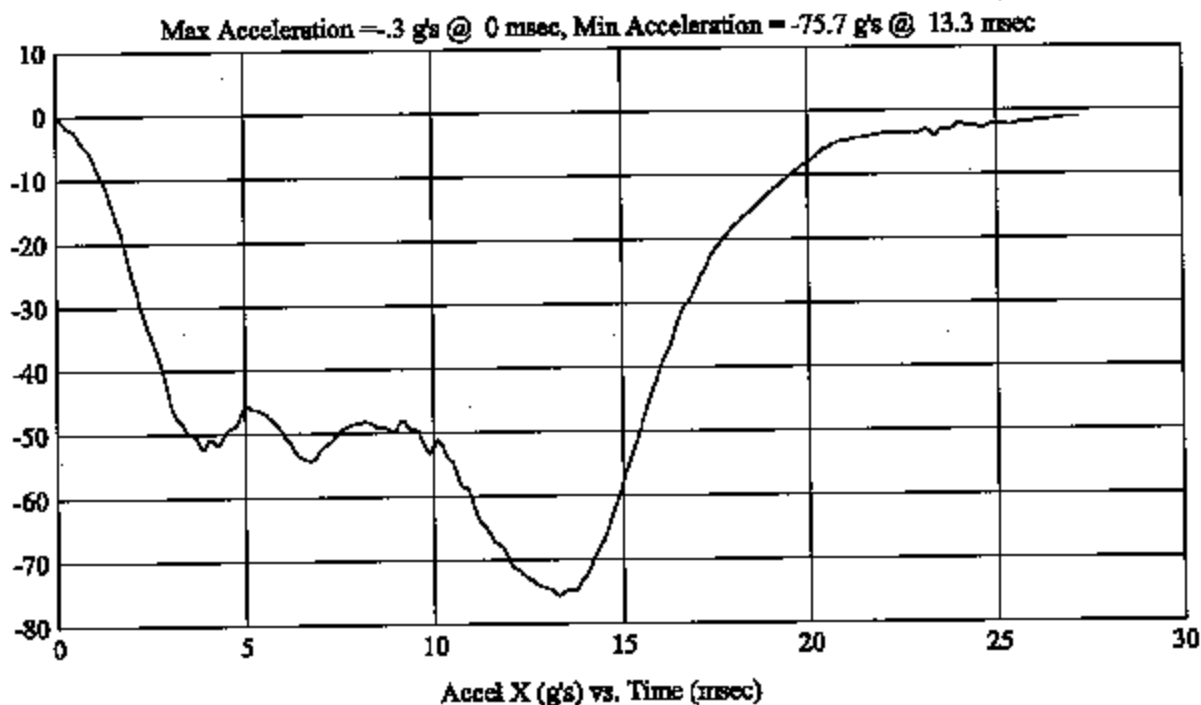
Customer: DODGE
Test # 9
FM4701
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/34

HIC(d) = 419, HIC = 335, Delta T = 14.2 msec



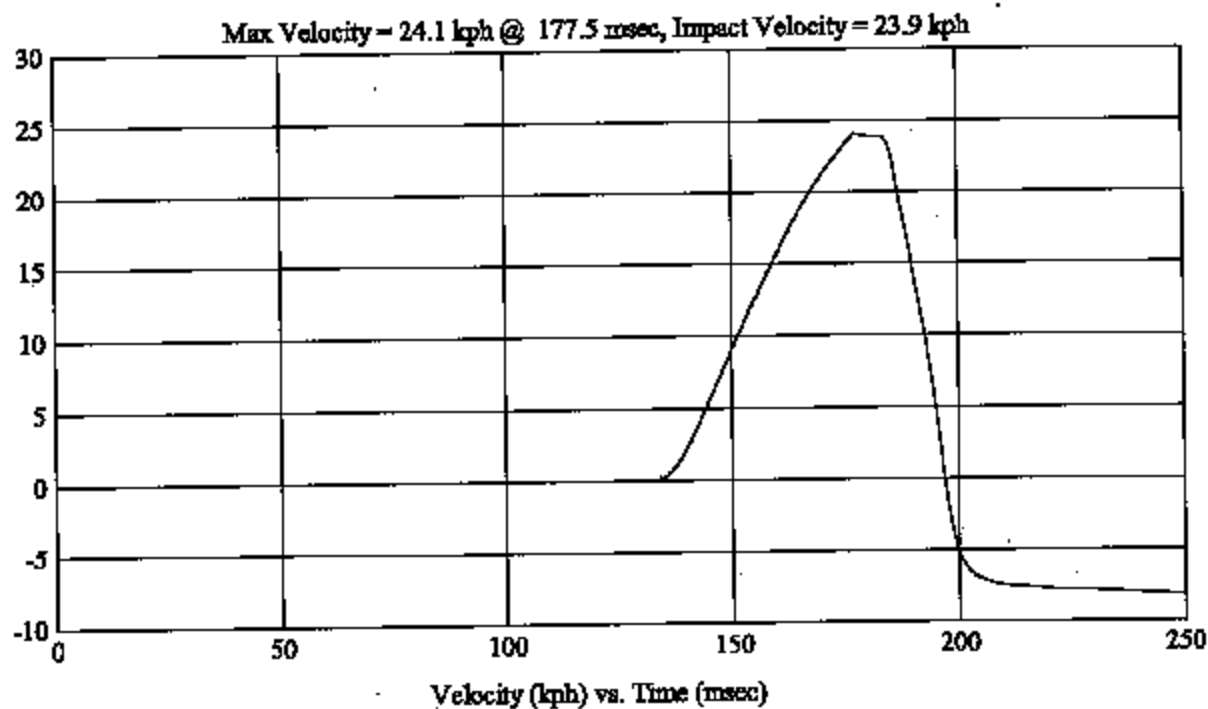
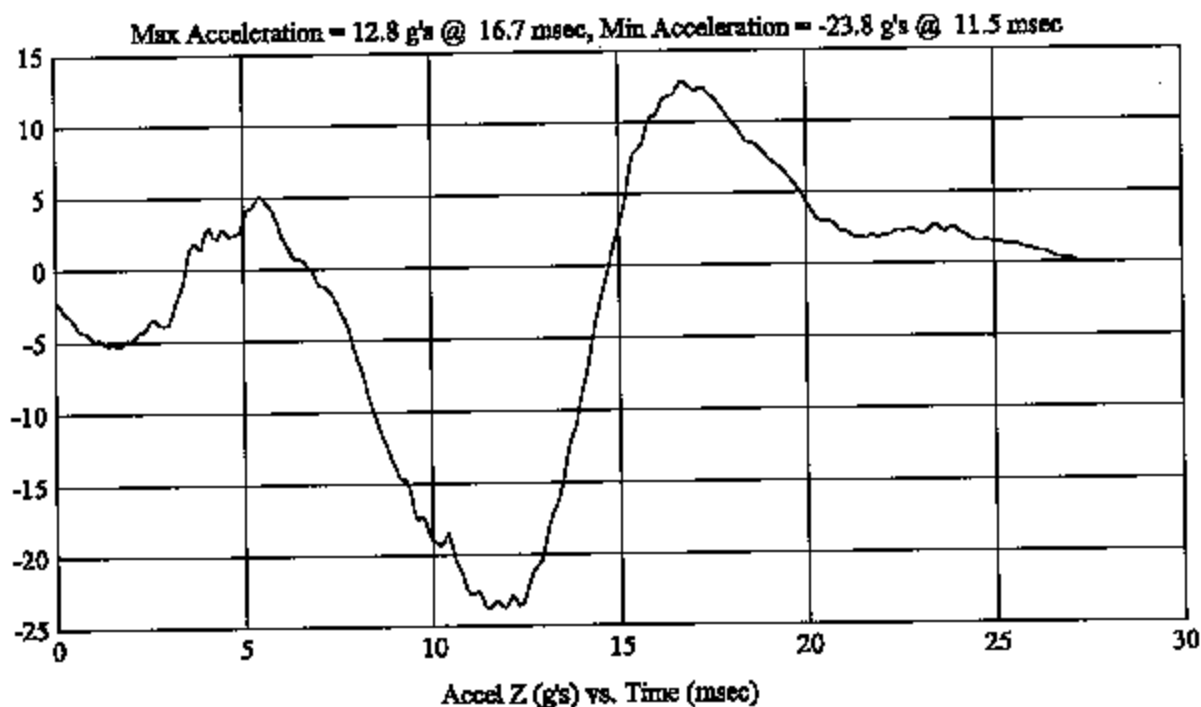
FMH
G05I7-001.1Customer: DODGE
Test # 9
FM4701
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/34

HIC(d) = 419, HIC = 335, Delta T = 14.2 msec



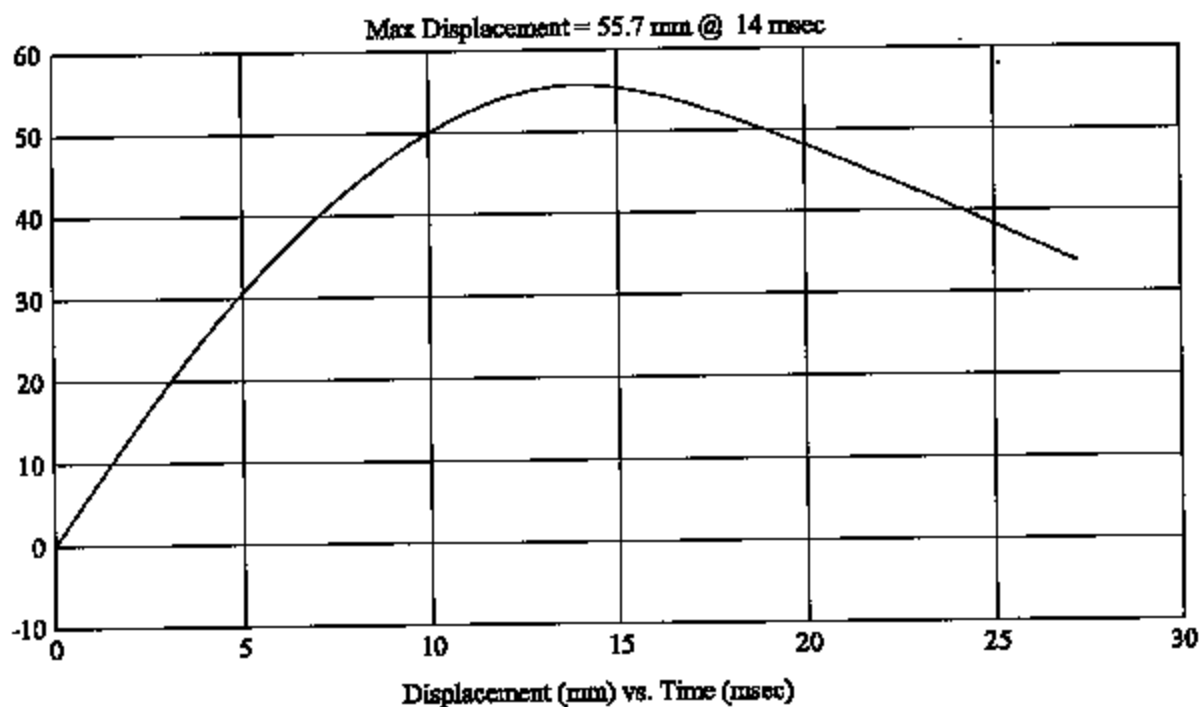
FMH
G05T7-001.1Customer: DODGE
Test # 9
FM4701
Additional Desc: N/A

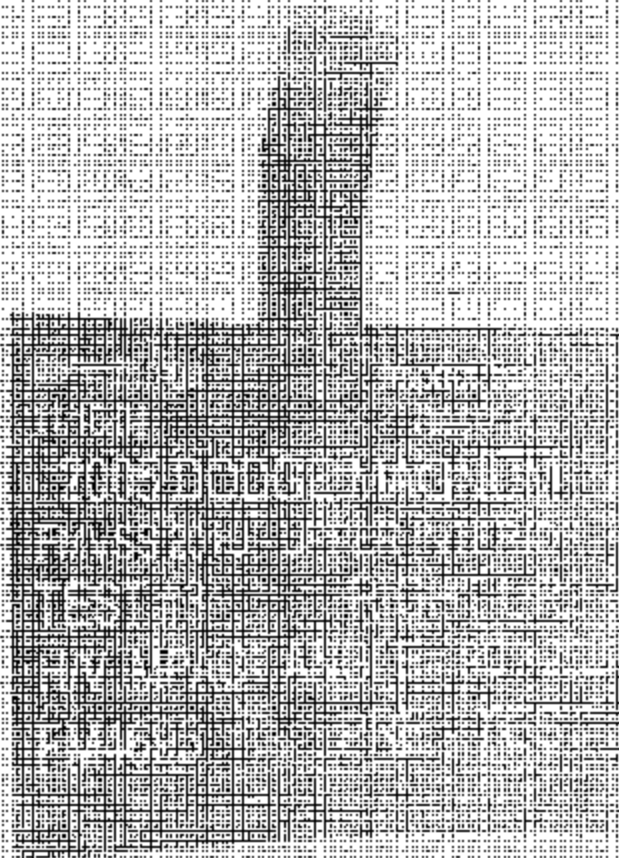
Vehicle Program : MAGNUM

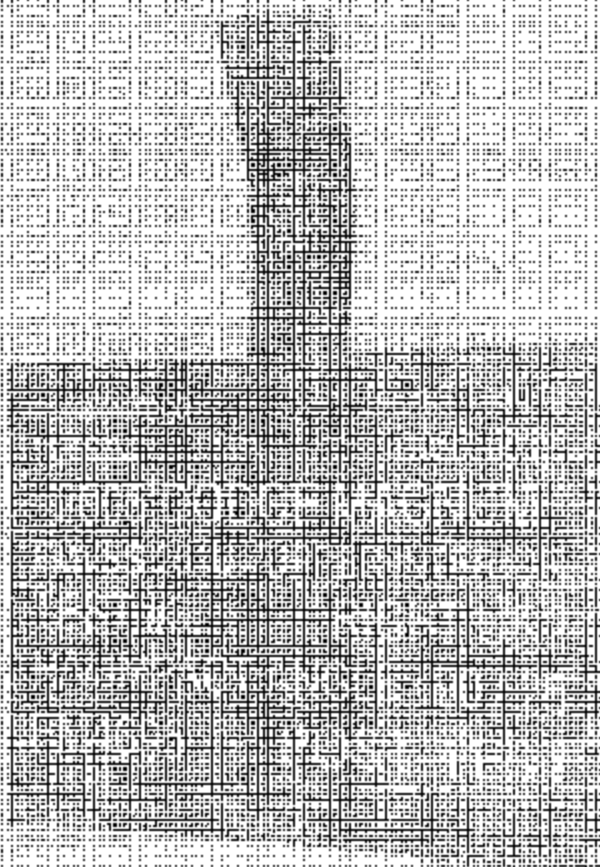
Test Date: 11/17/04

Model Year: 2005
Target: UR1
Vehicle Side: Left
Horz/Vert Angle: 270/34

HIC(d) = 419, HIC = 335, Delta T = 14.2 msec









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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR2 Right
MGA Test Reference No.: FM4685
Approach Horizontal Angles: 80°
Approach Vertical Angles: 25°
Additional Description:

Test Number: #3
Temperature: 24C
Humidity: 30%
Time of Test: 2:10 PM
FMH Serial No: 037

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
525	475	7.5	23.9	62	0

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35800	-98.4	1.47	1.47
Y	6	J35841	92.6	1.54	1.54
Z	7	J35791	88.8	1.46	1.46

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

Headliner displacement

Recorded By: mw j mcl Approved By: [Signature] Date: 11/16/04
*Only necessary for NHTSA (Government) Compliance testing.

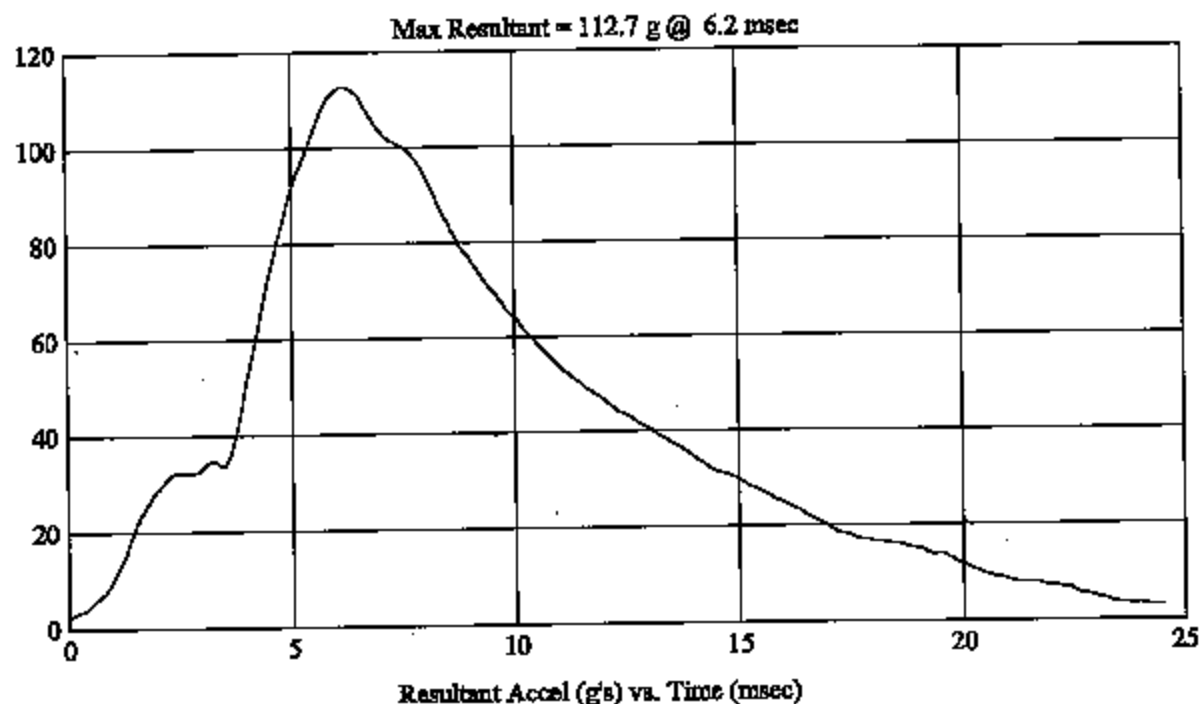
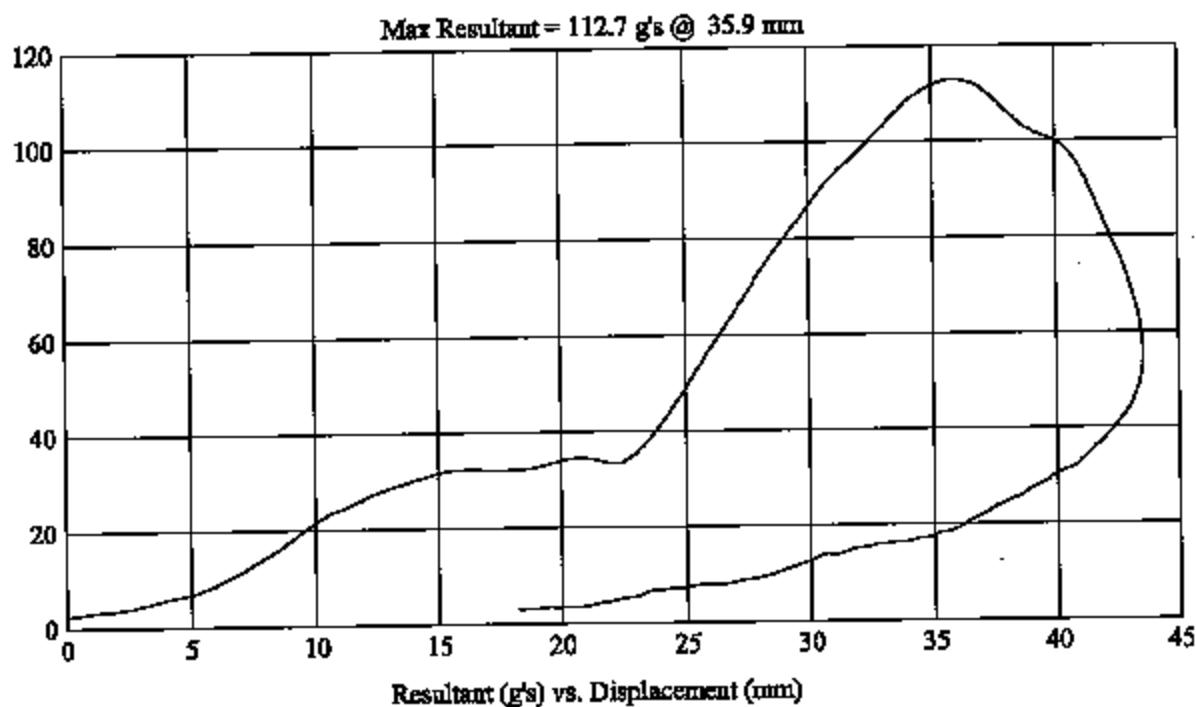
Customer: DODGE
Test # 3
FM4695
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: UR2
Vehicle Side: Right
Horz/Vert Angle: 90/25

HIC(d) = 525, HIC = 475, Delta T = 7.5 msec



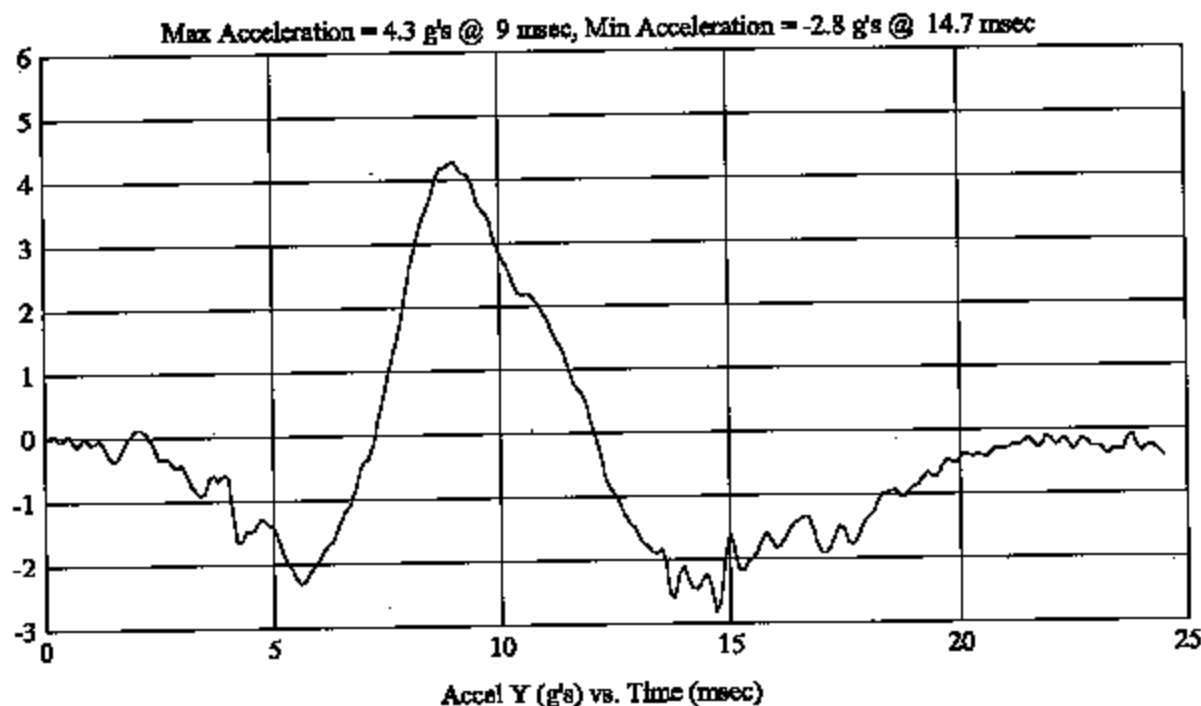
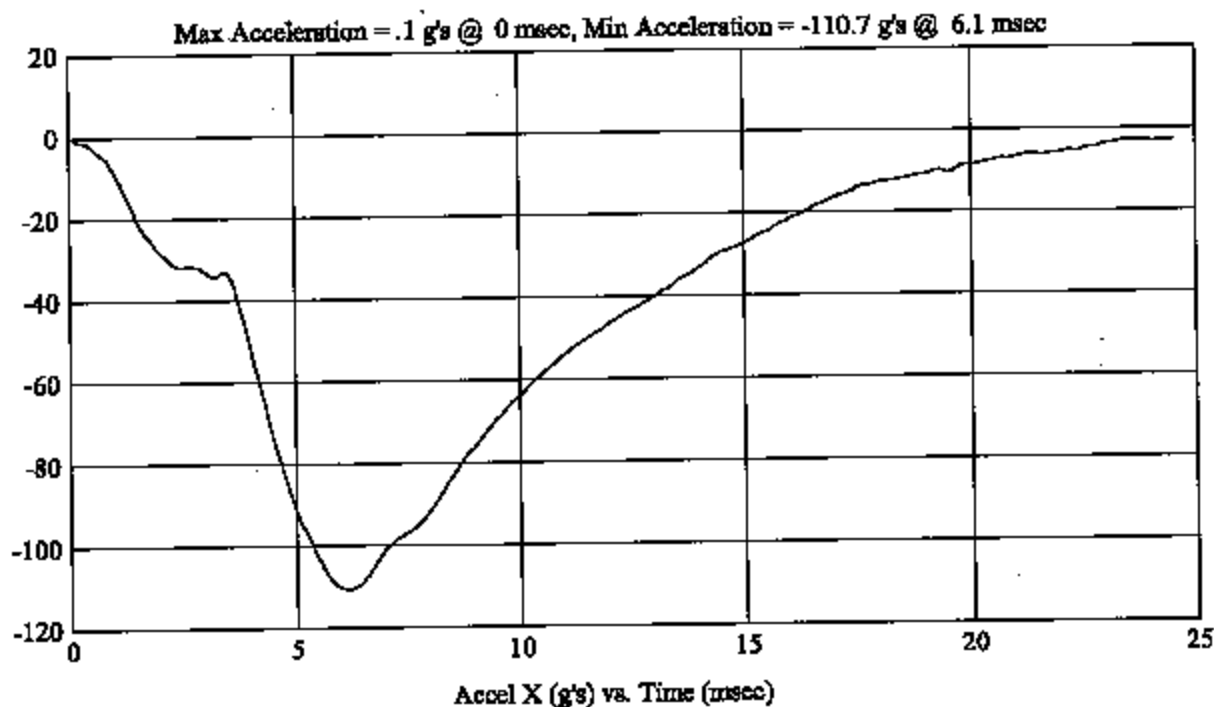
Customer: DODGE
Test # 3
FM4695
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: UR2
Vehicle Side: Right
Horz/Vert Angle: 90/25

HIC(d) = 525, HIC = 475, Delta T = 7.5 msec



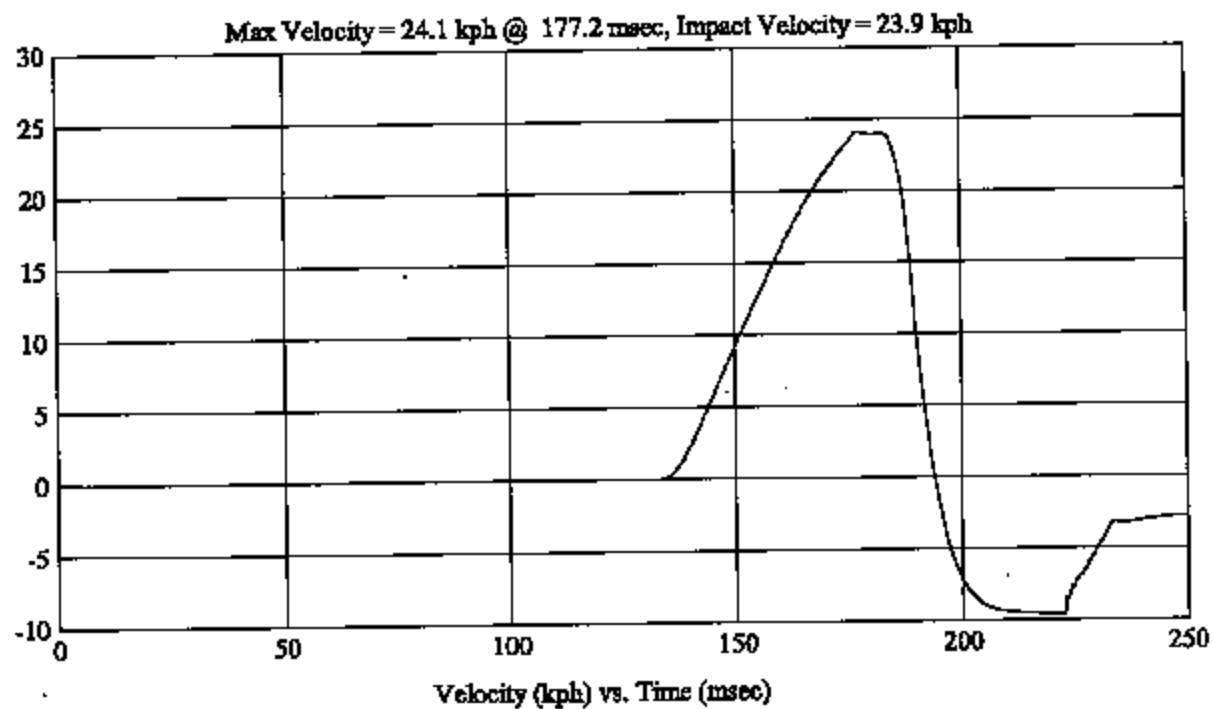
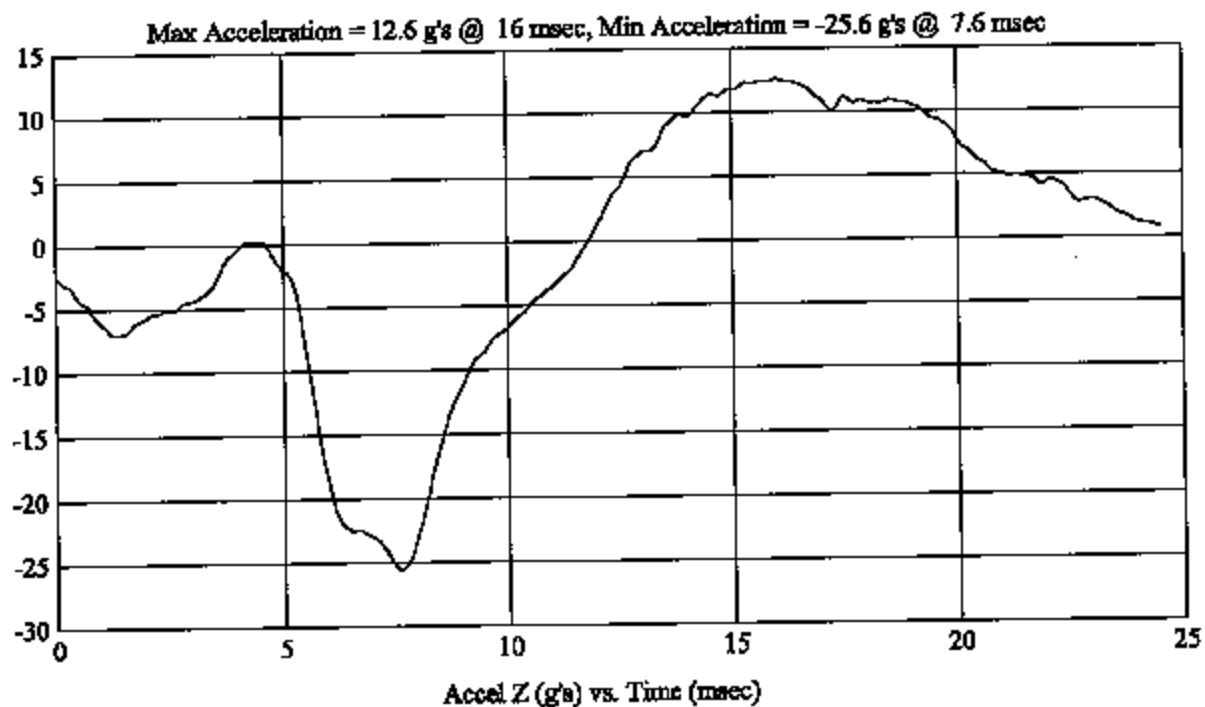
Customer: DODGE
Test # 3
FM4695
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: UR2
Vehicle Side: Right
Horz/Vert Angle: 90/25

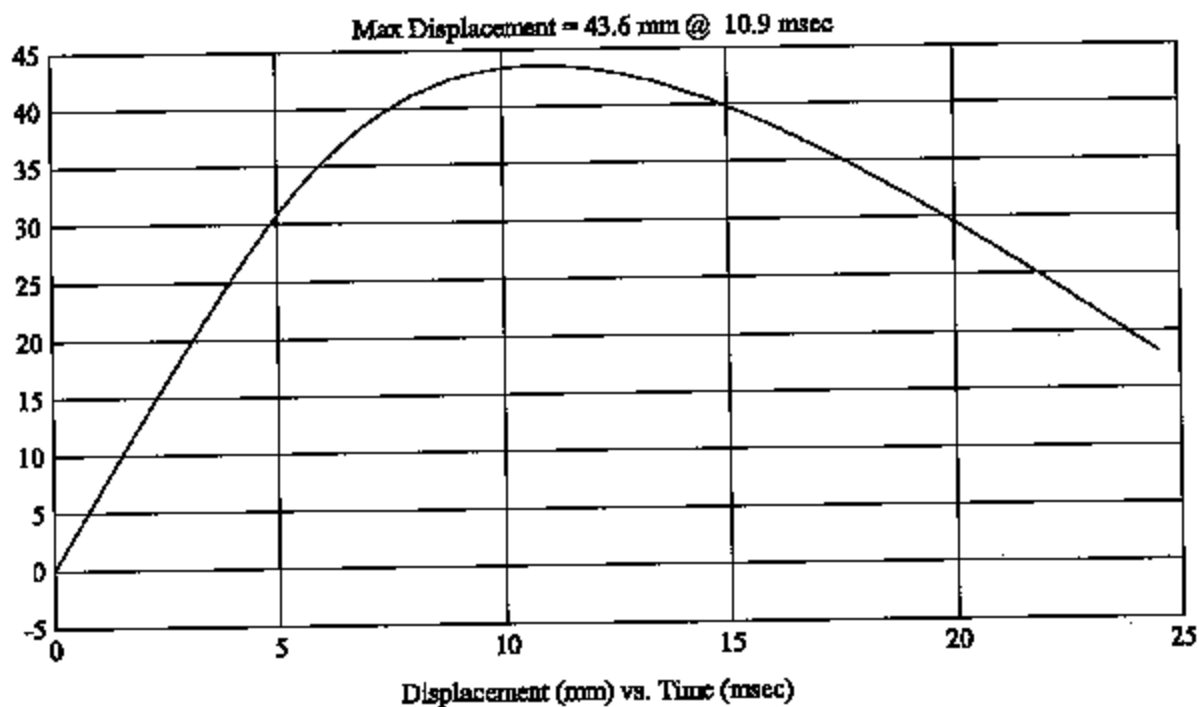
HIC(d) = 525, HIC = 475, Delta T = 7.5 msec



FMH
G0517-001.1Customer: DODGE
Test # 3
FM4695
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/16/04

Model Year: 2005
Target: UR2
Vehicle Side: Right
Horz/Vert Angle: 90/25 $HIC(d) = 525$, $HIC = 475$, $\Delta T = 7.5 \text{ msec}$ 

12/17/04

12/17/04

12/17/04

12/17/04

2005 DODGE MAGNUM

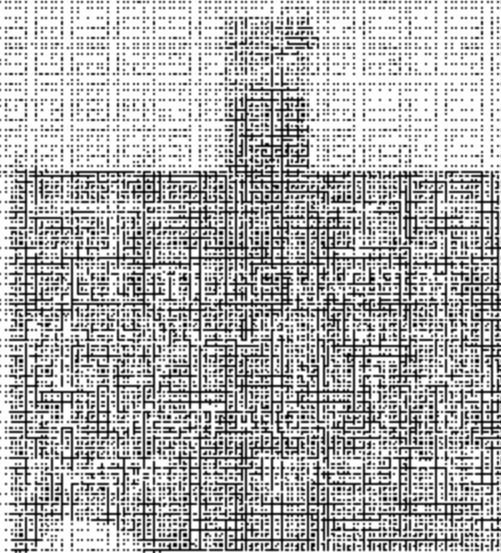
FMVSS 2010 - UPPER INTERIOR

TEST #7 RIGHT UR7

HM IMPACT ANGLE= 39 / 50

FM4699

PRE-TEST





MICHIGAN OPERATIONS
DATE: 2/8/01
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SUMMARY OF FMVSS 201U TEST

JOB/NHTSA NO: G0517-001.1 VEHICLE YR/MAKE/MODEL: 2005/DODGE/MAGNUM

GENERAL TEST PARAMETERS:

Target (Vehicle Side): UR7 Right

MGA Test Reference No.: FM4699

Approach Horizontal Angles: 33°

Approach Vertical Angles: 50°

Additional Description:

Test Number: #7

Temperature: 25C

Humidity: 37%

Time of Test: 10:00 AM

FMH Serial No: 035

TEST RESULTS:

HIC(d)	HIC	Δt (msec)	Velocity (kph)	Impact location on FMH (mm)	
				Above Pt. O	Left/Right Pt. O
650	641	7.2	23.9	18	13 L

INSTRUMENTATION INFORMATION: (all accelerometers are Endevco 7264-2000)

Axis	Channel	Serial No.	DLR Value	ΔV Pre-Test	ΔV Post-Test
X	5	J35924	-94.1	1.47	1.47
Y	6	J35918	94.3	1.54	1.54
Z	7	J22684	92.7	1.46	1.19

REMARKS (Summary of test, damage, non-compliance, invalid test, etc.):

No visible damage

Recorded By: *[Signature]*

Approved By: *[Signature]*

Date: 11/17/04

*Only necessary for NHTSA (Government) Compliance testing.

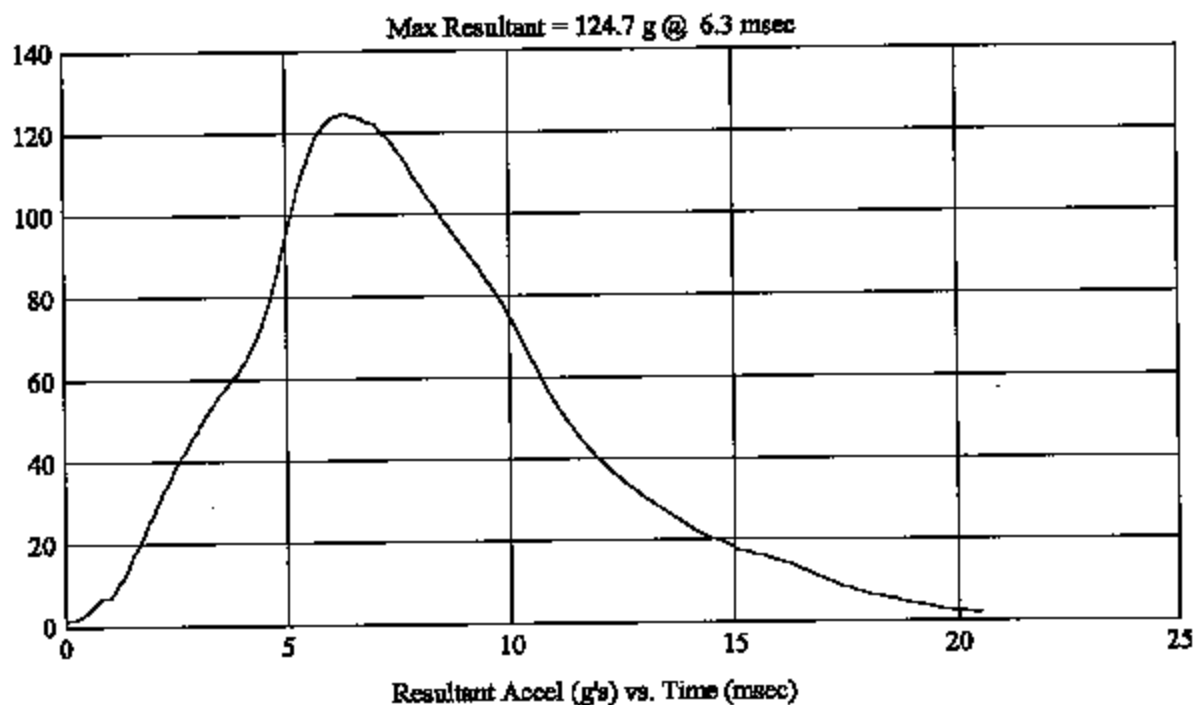
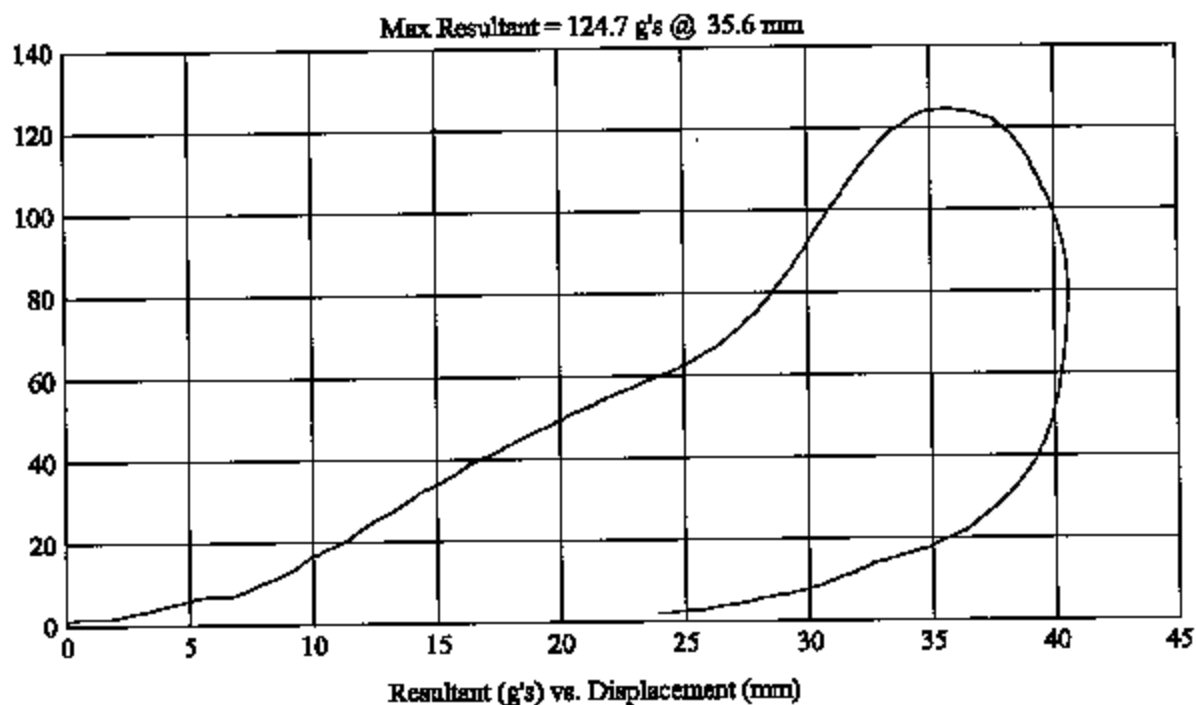
FMH
G0517-001.1Customer: DODGE
Test # 7
FM4699
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR7
Vehicle Side: Right
Horz/Vert Angle: 33/50

HIC(a) = 650, HIC = 641, Delta T = 7.2 msec



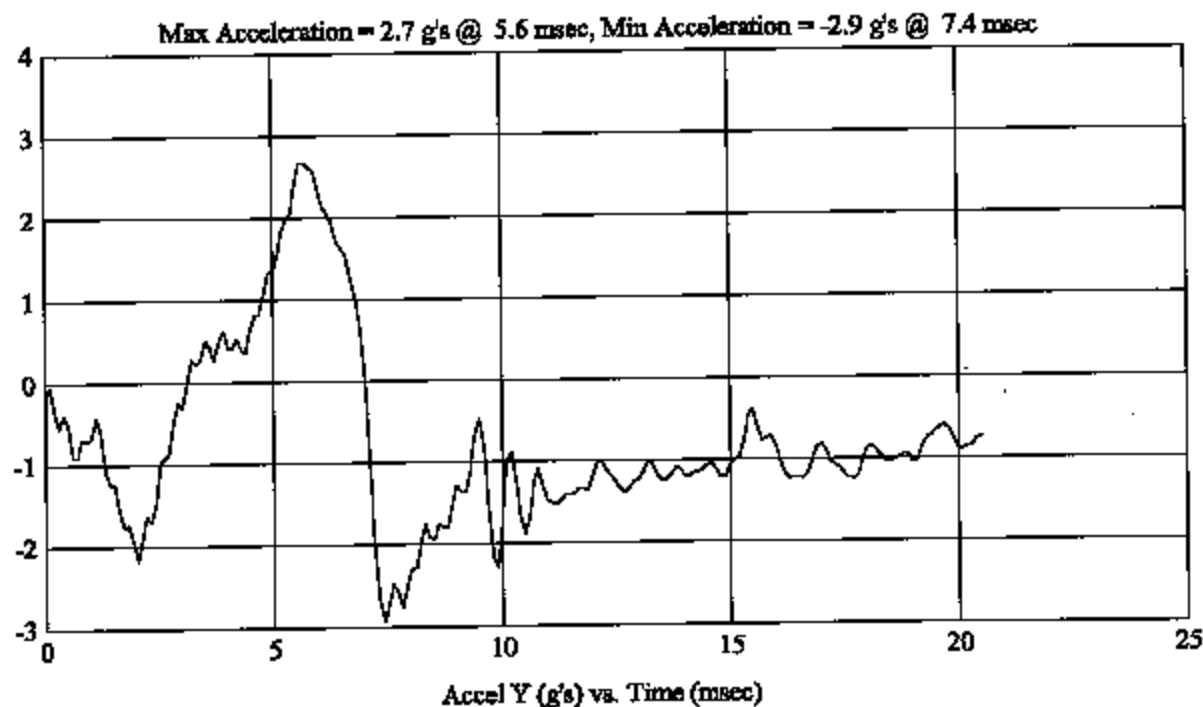
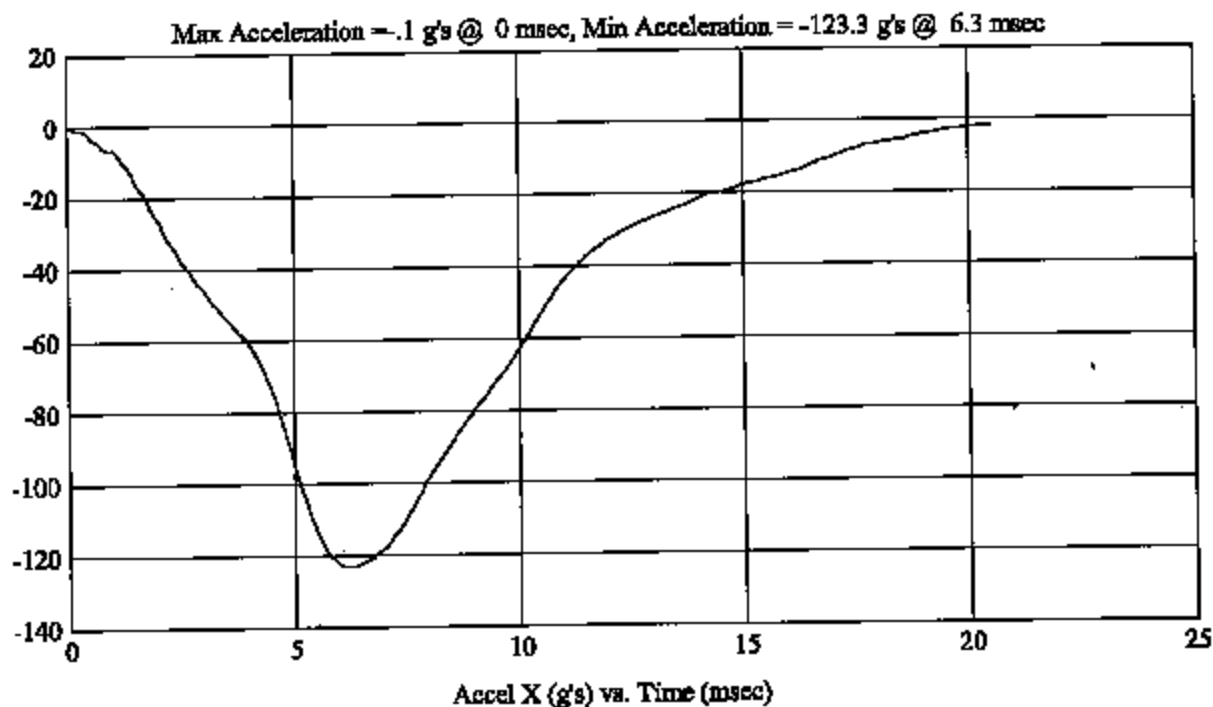
Customer: DODGE
Test # 7
FM4699
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR7
Vehicle Side: Right
Horz/Vert Angle: 33/50

HIC(d) = 650, HIC = 641, Delta T = 7.2 msec



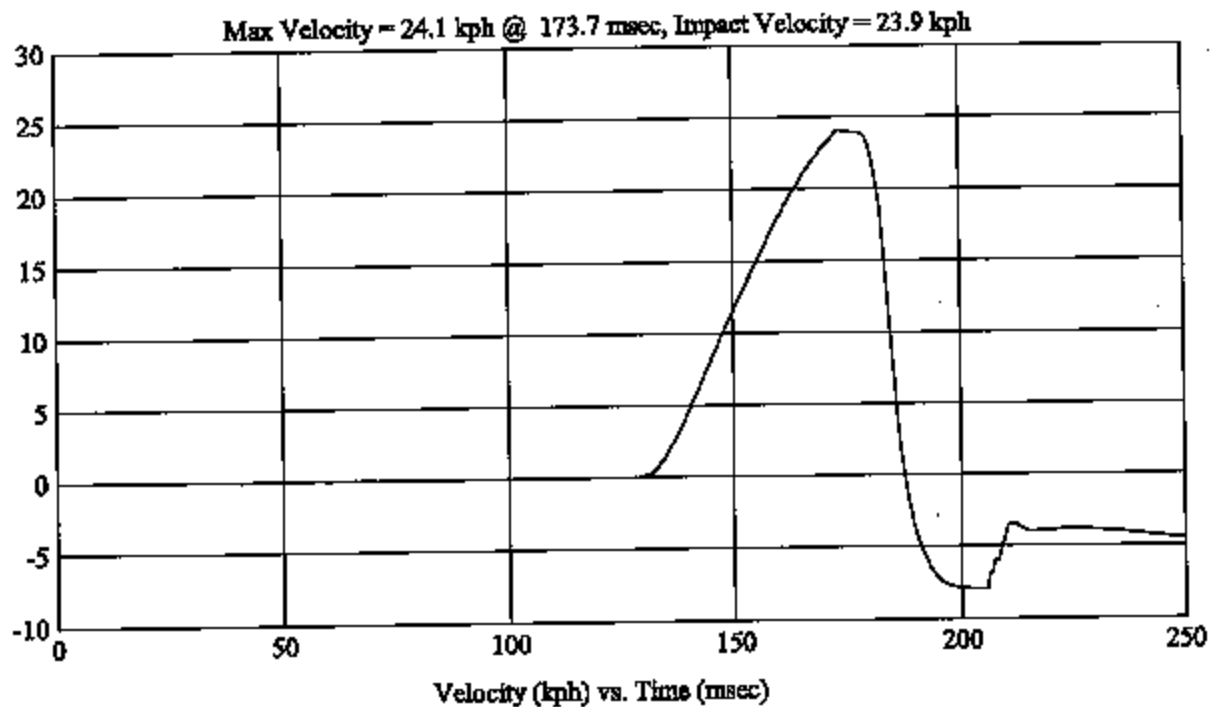
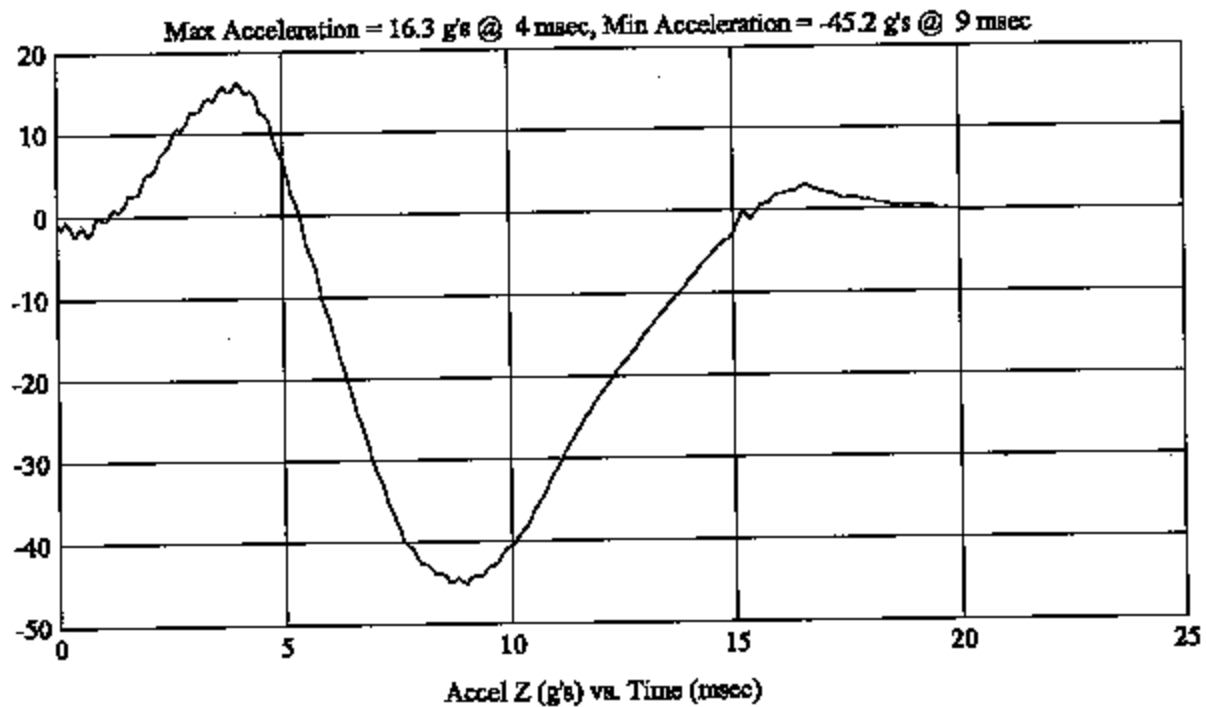
Customer: DODGE
Test # 7
FM4699
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR7
Vehicle Side: Right
Horz/Vert Angle: 33/50

HIC(d) = 650, HIC = 641, Delta T = 7.2 msec



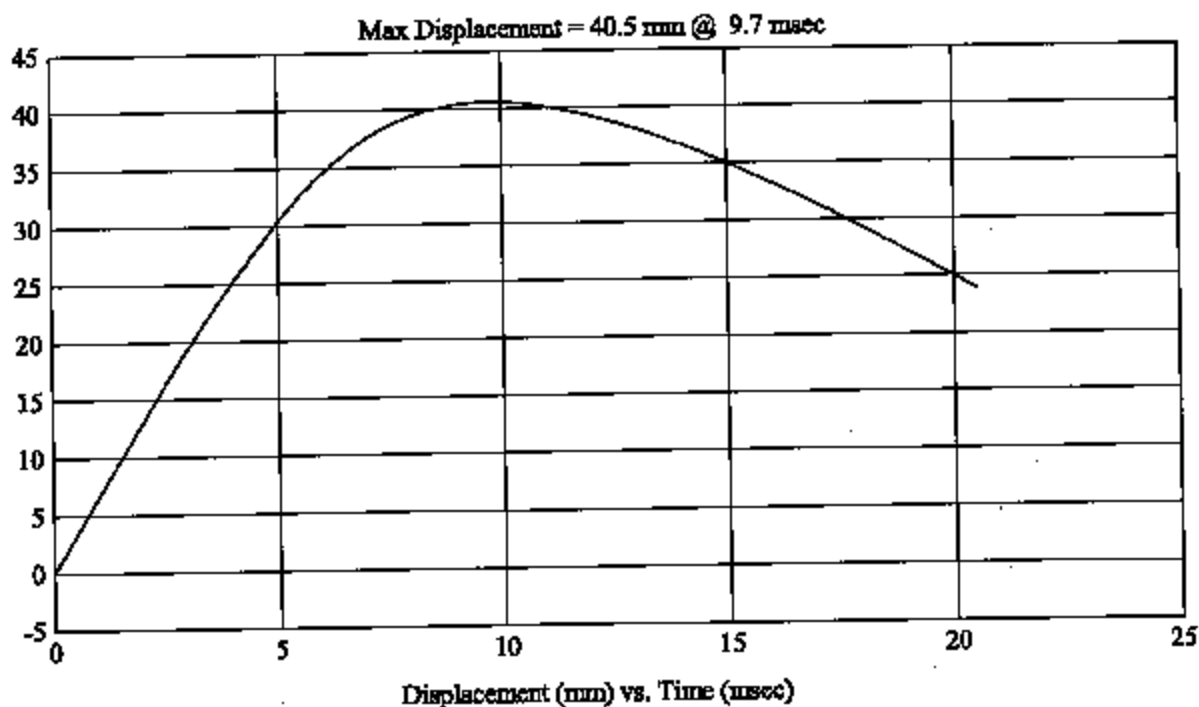
FMH
G05W-001.1Customer: DODGE
Test # 7
FM4699
Additional Desc: N/A

Vehicle Program : MAGNUM

Test Date: 11/17/04

Model Year: 2005
Target: UR7
Vehicle Side: Right
Horz/Vert Angle: 33/50

HIC(d) = 650, HIC = 641, Delta T = 7.2 msec



4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

The following section lists the test equipment for the compliance test series. Items marked with an asterisk are calibrated by an external lab. An additional summary table is given for the pre and post-test calibration data for the Free Motion Headforms. The temperature trace to confirm testing was conducted between 66°F and 78°F (19°C - 26°C) is included in Appendix A. Calibration certificates can be found in Appendix B.

TABLE 4-1 LIST OF ITEMS USED

ITEM	MANUFACTURER NAME	MODEL #	FUNCTION OF ITEM	ACCURACY	CAL. INTERNAL
Head Drop Tower (includes test frame and DAS)	MGA Research Corp.	MGA-100-DC	FMH Calibration	N/A	N/A
Accelerometers	Endevco	7264-2000	Acceleration Data	±0.5%	6 months
*Digital Inclinometer	Mitutoyo	PRO 360	Set Angle of FMH/Targeting	0.1°	Annual
FMVSS 201U Test Frame (includes the propulsion control system, actuator, test frame, and DAS)	MGA Research Corp.	MGA-100-FMH	Test System	N/A	N/A
Free Motion Headforms	UTAMA UTAMA UTAMA UTAMA	036 036 037 038	Test Device	N/A	Pre and Post-Test Series
High Speed Video	Kodak	RO1000	Record Event	N/A	N/A
*FARO™	Faro Technologies	G08020203122	Targeting	0.1 mm	Annual
Measuring Devices: - Tape Measure - Plumb Bobs - Protractor	Stanley N/A Mitutoyo	424 - Pro 360	Measurement Targeting FMH setup - Horizontal Measurement	1 mm N/A 0.5°	Annual
*Vehicle Scale	SW Deluxe	26032389	Weighing Vehicle	± .5 kg	Annual
* Scale	Detecto	AP-20	Weigh FMH Head	± 0.01 lb	Annual
*Temperature Recorder	Dickson	TR-320	Record Temperature and Humidity	± 1°C ± 1% RH	Annual

TABLE 4-2 FMH CALIBRATION SUMMARY DATA SUMMARY TABLE

FMH Serial #		Weight (lbs)	Temp (°C)	% Humidity	Peak Resultant Acceleration (G's)	Peak Lateral Acceleration (G's)	Unimodal
Pre	#35	10.02	23	24	245.0	3.0	Yes
Post	#35	10.02	23	42	246.4	3.2	Yes
Pre	#36	9.98	23	28	261.2	6.7	Yes
Post	#36	9.98	23	42	245.2	5.7	Yes
Pre	#37	9.96	23	28	267.1	10.1	Yes
Post	#37	9.96	23	44	266.2	14.8	Yes
Pre	#38	9.92	23	28	241.4	6.1	Yes
Post	#38	9.92	23	44	244.3	4.5	Yes

RECORDED BY: David G. GotwalsDATE: November 18, 2004APPROVED BY: Helen A. Kalato

HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: <u>35</u> CALIBRATION DATE: <u>11-15-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.02
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	24
Peak Resultant Acceleration	225 G's to 275 G's	295.0
Peak Lateral Acceleration	15 G's Maximum	3.0
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
5	ENDEVCO	7264-2000	335924	11-9-04	5-9-05
6	ENDEVCO	7264-2000	335919	11-9-04	5-9-05
7	ENDEVCO	7264-2000	322664	11-9-04	5-9-05

REMARKS:

RECORDED BY: Matt Kunk

DATE: 11/15/04

APPROVED BY: [Signature]

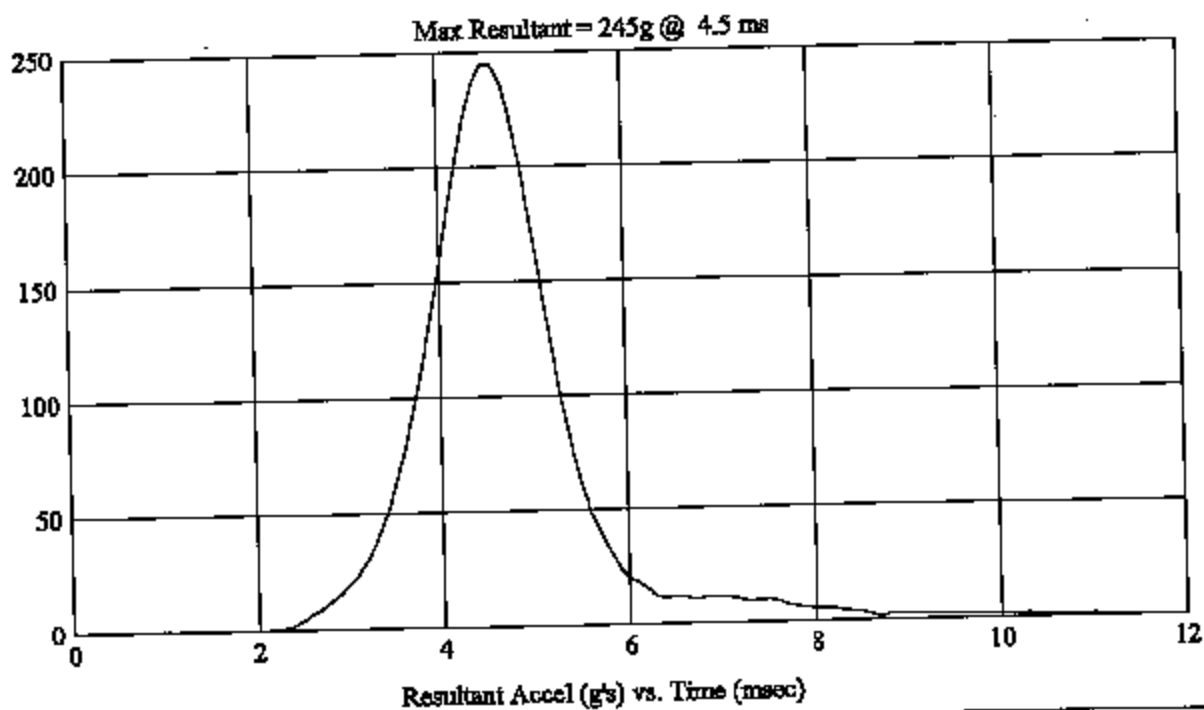
Head Drop
(Preliminary Test Report)

4-4

Test Number: H35273
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001.1

Test Date: 11/15/04
Head #: 35



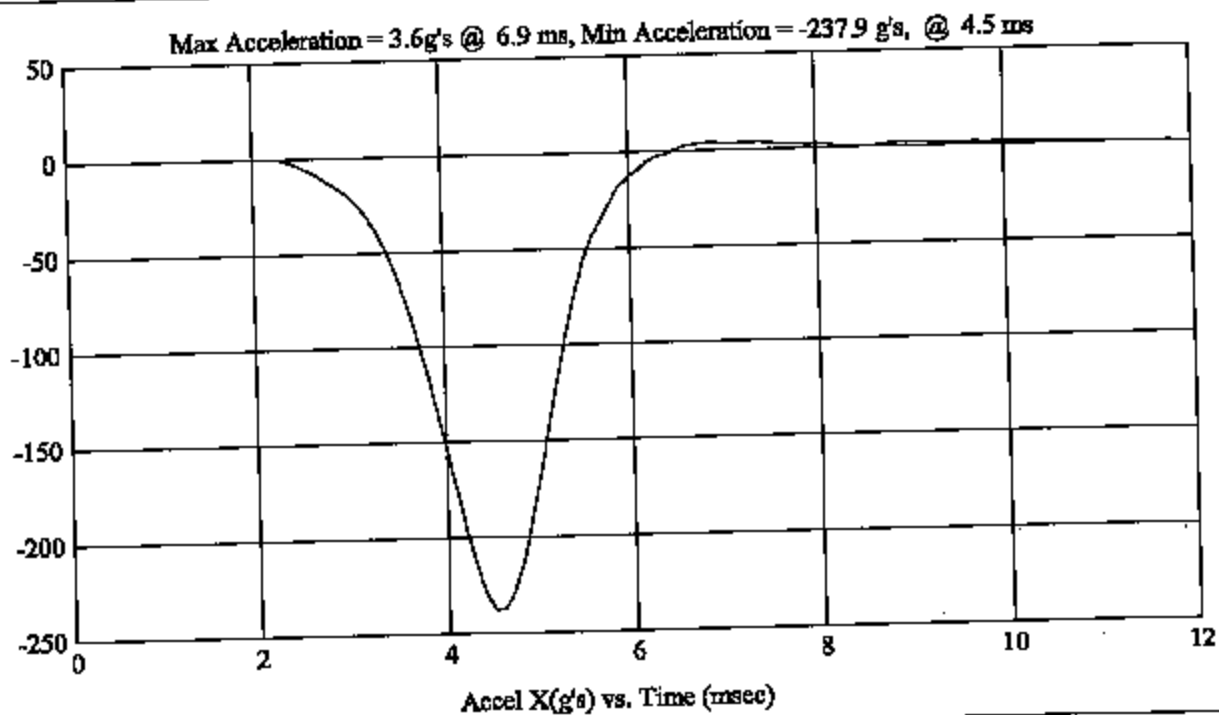
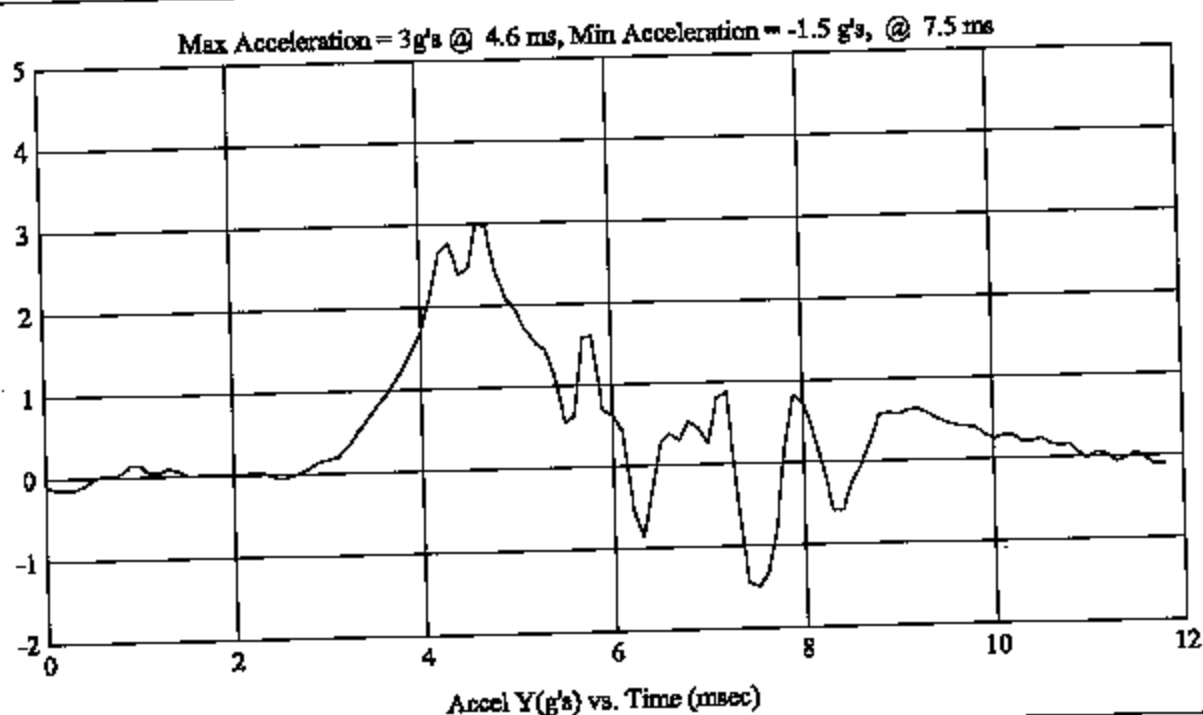
Head Drop
(Preliminary Test Report)

4-5

Test Number: H35273
Test Description: Pre - Test Calibration

MGA Job Number: G04I7-001.1

Test Date: 11/15/04
Head #: 35



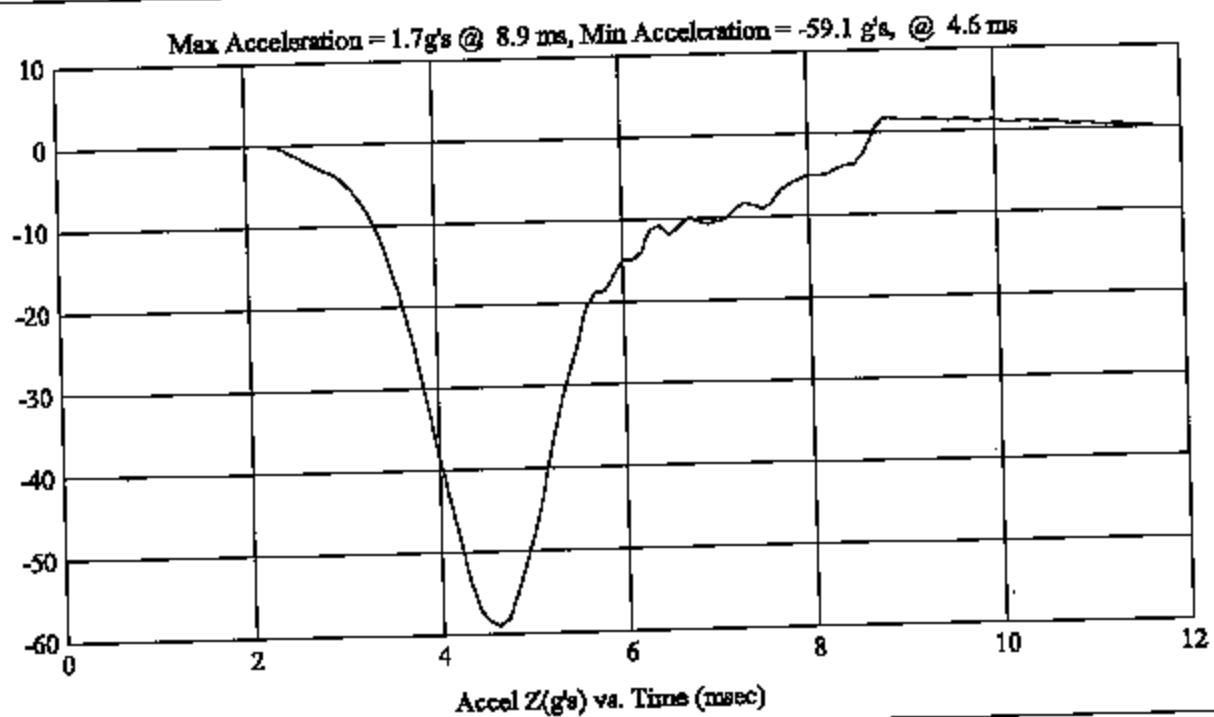
Head Drop
(Preliminary Test Report)

4-6

Test Number: H35273
Test Description: Pre - Test Calibration

MGA Job Number: G04Y7-001.1

Test Date: 11/15/04
Head #: 35



HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: <u>035</u> CALIBRATION DATE: <u>11-18-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	10.02
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	42
Peak Resultant Acceleration	225 G's to 275 G's	246.4
Peak Lateral Acceleration	15 G's Maximum	3.2
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	535924	11-9-04	5-9-05
2	ENDEVCO	7264-2000	535919	11-9-04	5-9-05
3	ENDEVCO	7264-2000	522664	11-9-04	5-9-05

REMARKS:

RECORDED BY:

[Signature]

DATE:

11-18-04

APPROVED BY:

[Signature]

Head Drop
(Preliminary Test Report)

4-8

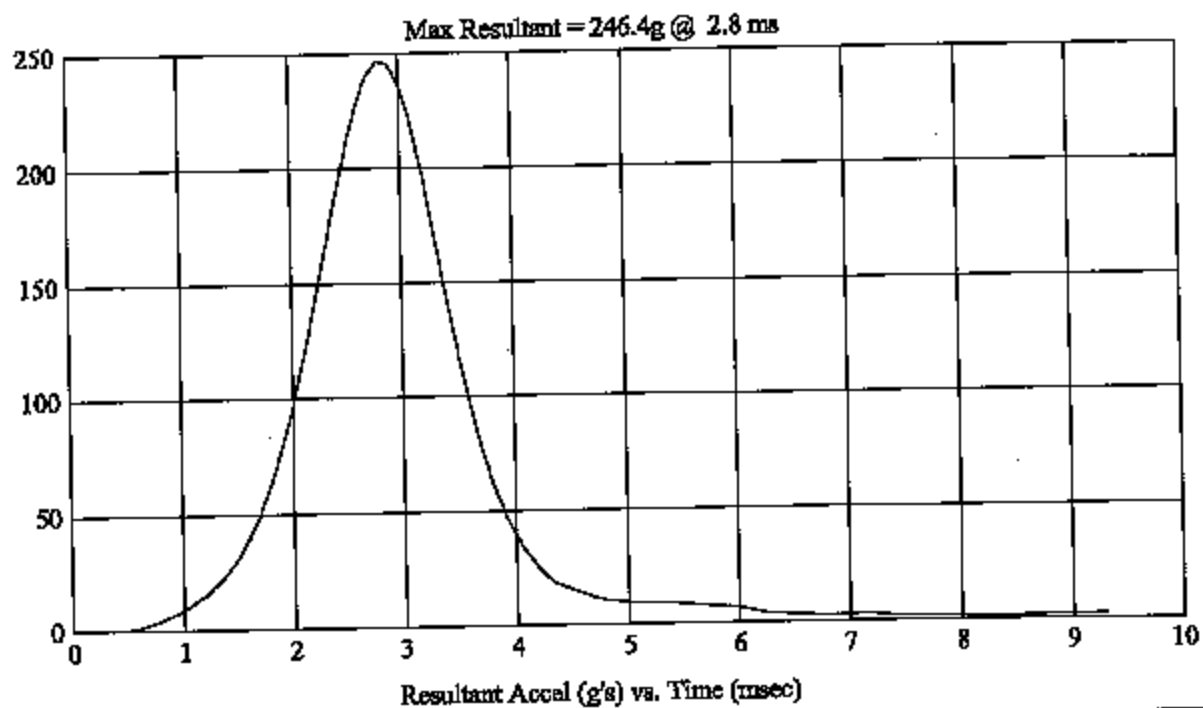
Test Number: H35274

MGA Job Number: G04I7-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 035



Head Drop
(Preliminary Test Report)

4-9

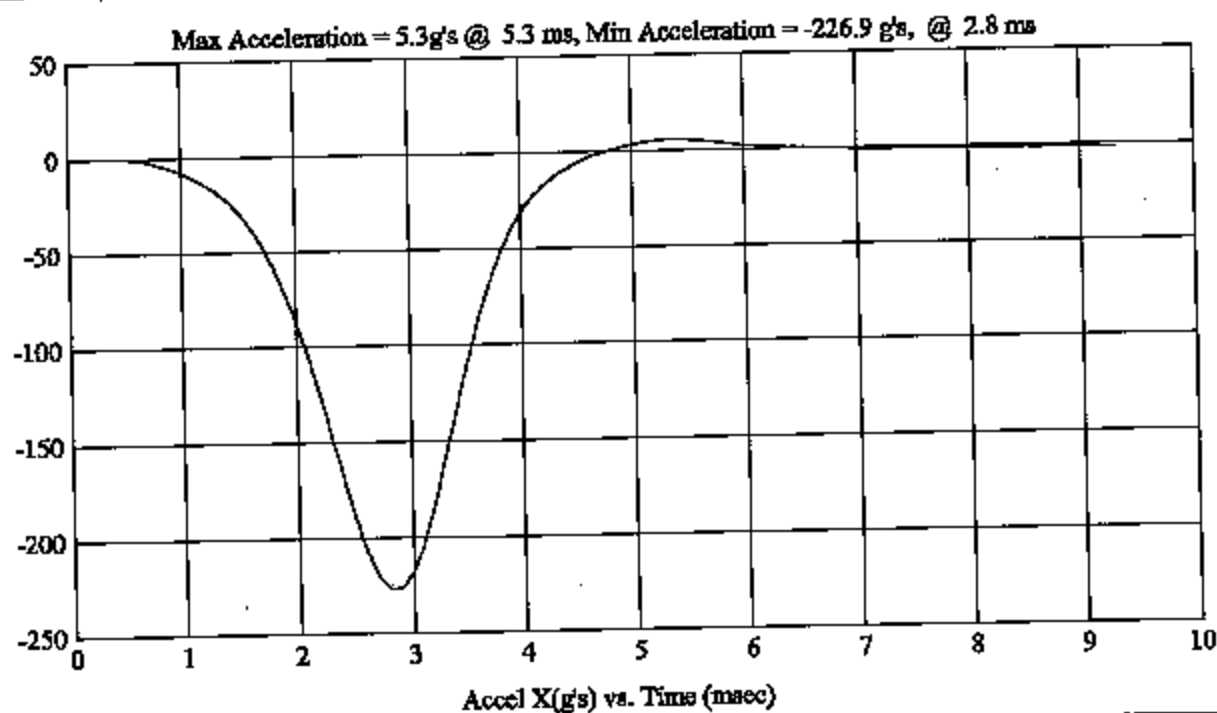
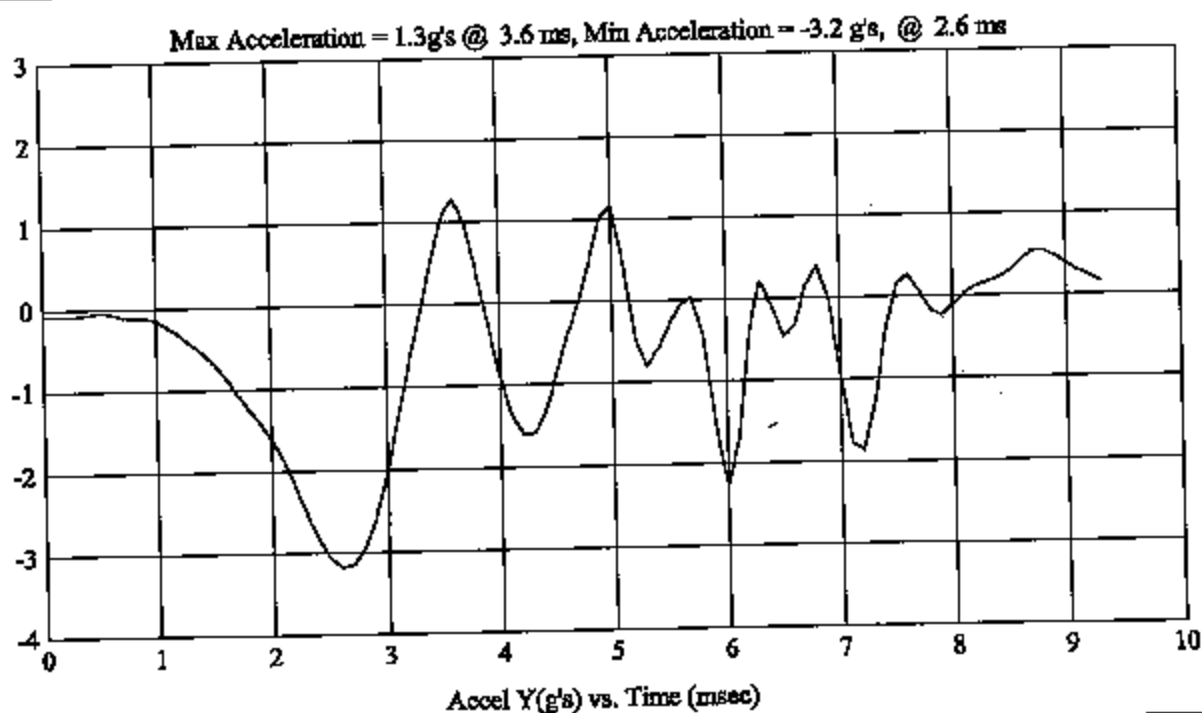
Test Number: H35274

MGA Job Number: G04I7-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 035



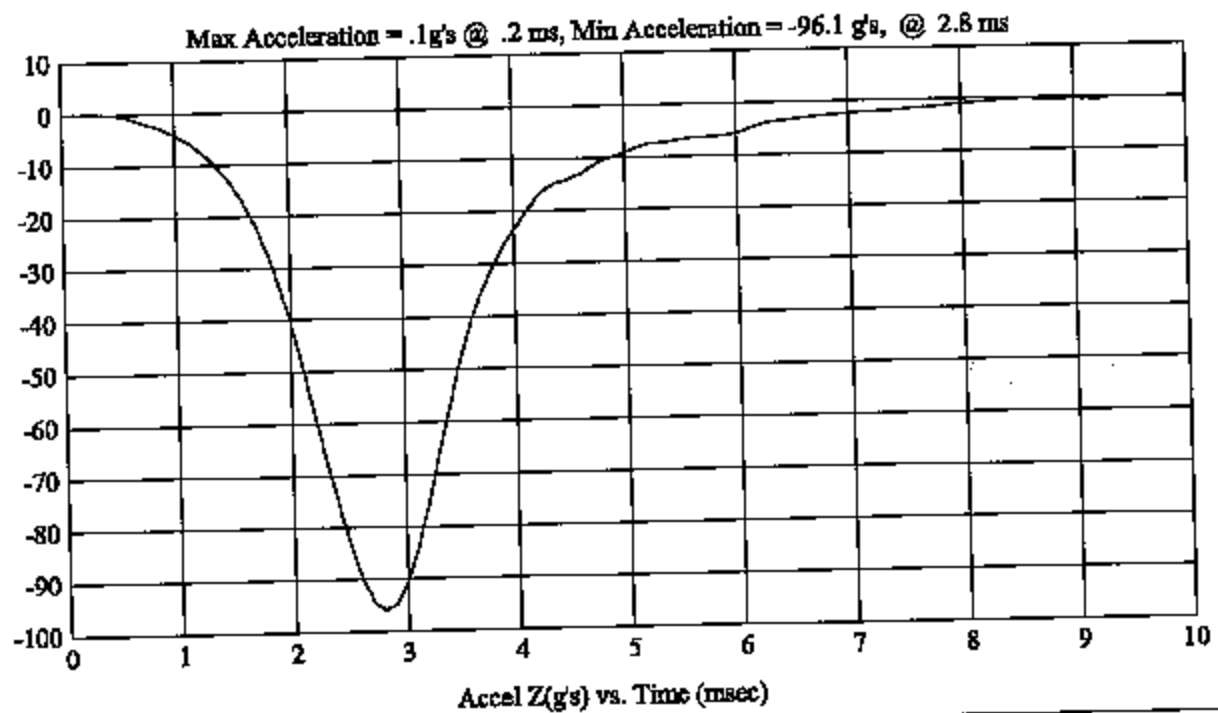
Head Drop
(Preliminary Test Report)

4-10

Test Number: H35274
Test Description: Post - Test Calibration

MGA Job Number: G0417-001.1

Test Date: 11/18/04
Head #: 035



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DATE: 3/2003
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DOC. NO: MGATP201UHD
REVISION NO.: 6
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HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>36</u>		CALIBRATION DATE: <u>11/16/04</u>
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.98
Temperature	19° C to 26° C	23°
Relative Humidity	10% to 70%	28%
Peak Resultant Acceleration	225 G's to 275 G's	261.2
Peak Lateral Acceleration	15 G's Maximum	6.7
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
X	ENDEVCO	7264-2000	335923	11-09-04	5-09-05
Y	ENDEVCO	7264-2000	335916	11-09-04	5-09-05
Z	ENDEVCO	7264-2000	335918	11-09-04	5-09-05

REMARKS:

RECORDED BY: *Matthew*

DATE: 11/16/04

APPROVED BY: *[Signature]*

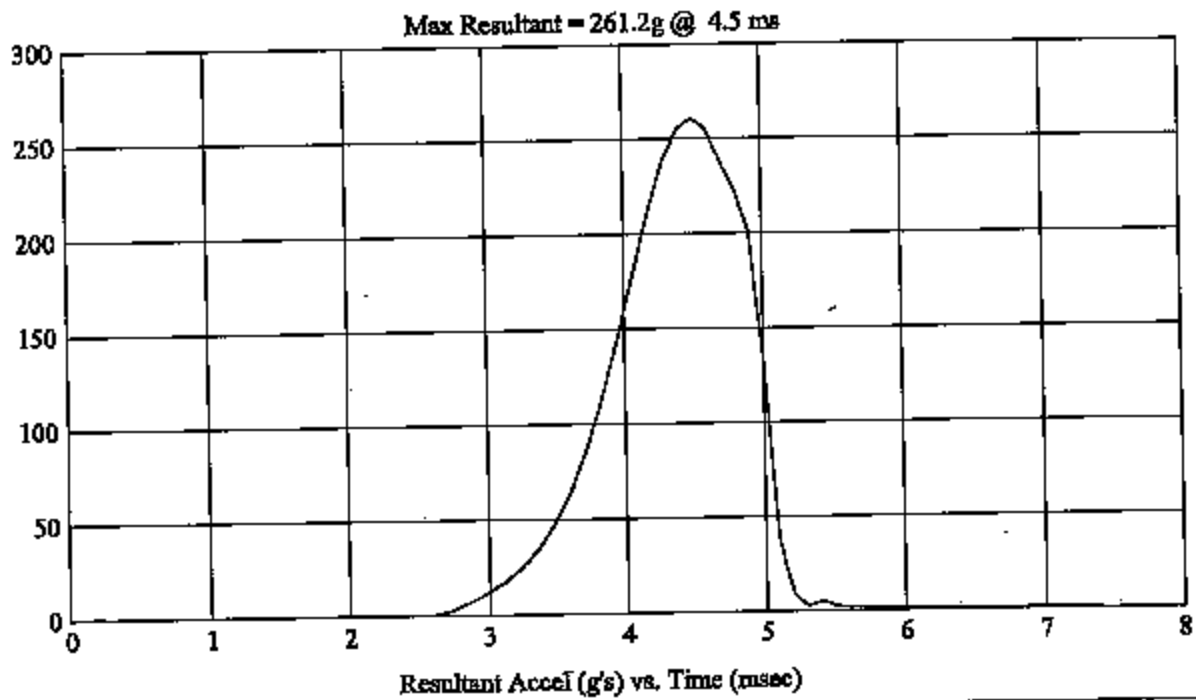
Head Drop
(Preliminary Test Report)

4-12

Test Number: H36271
Test Description: Pre - Test Calibration

MGA Job Number: G0517-001.1

Test Date: 11/16/04
Head #: 36



Head Drop
(Preliminary Test Report)

4-13

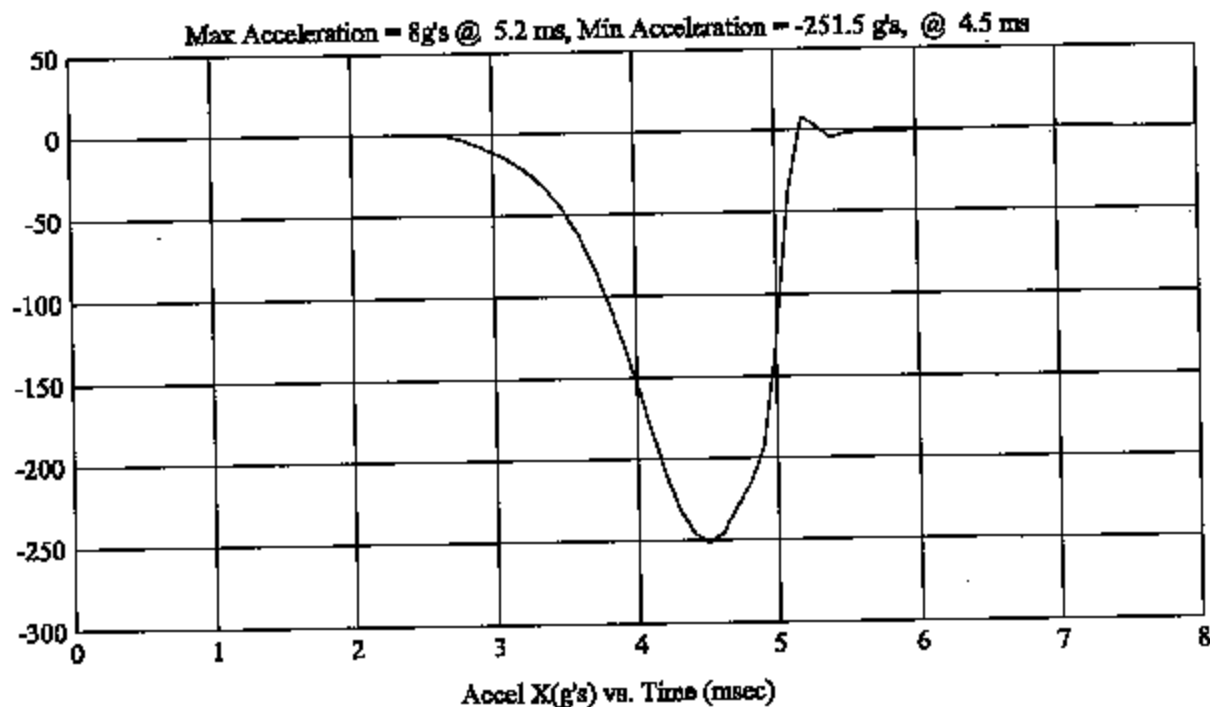
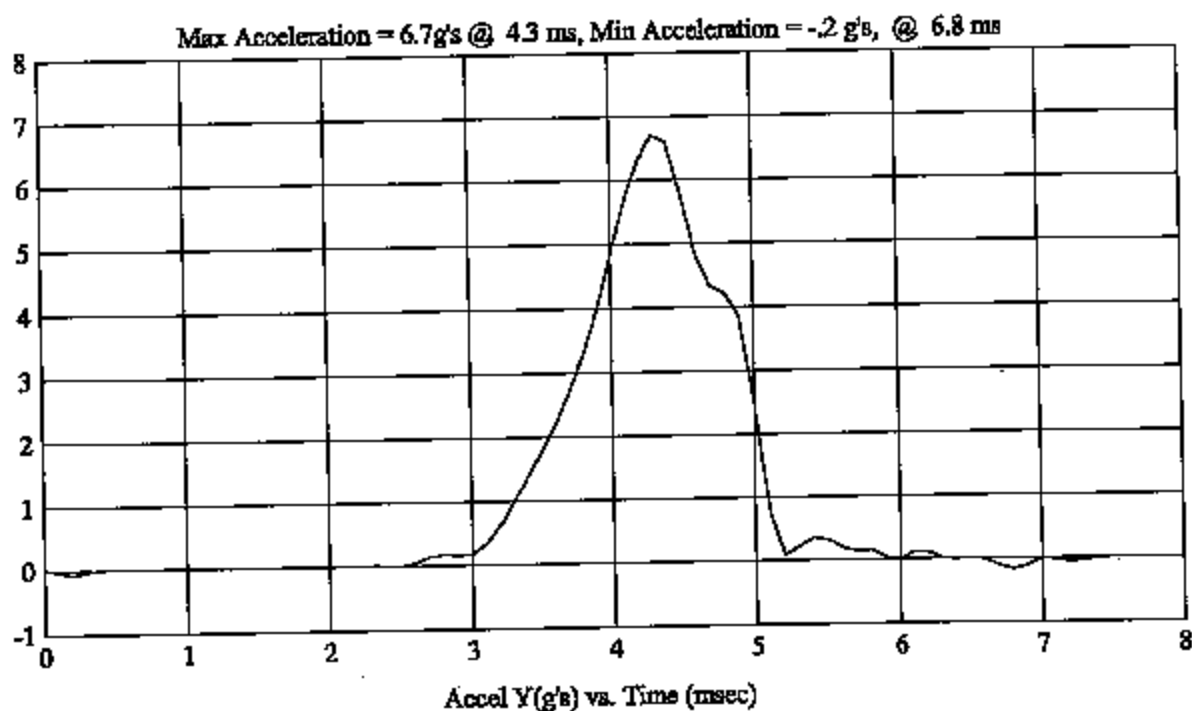
Test Number: H36271

MGA Job Number: G0517-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 36



Head Drop
(Preliminary Test Report)

4-14

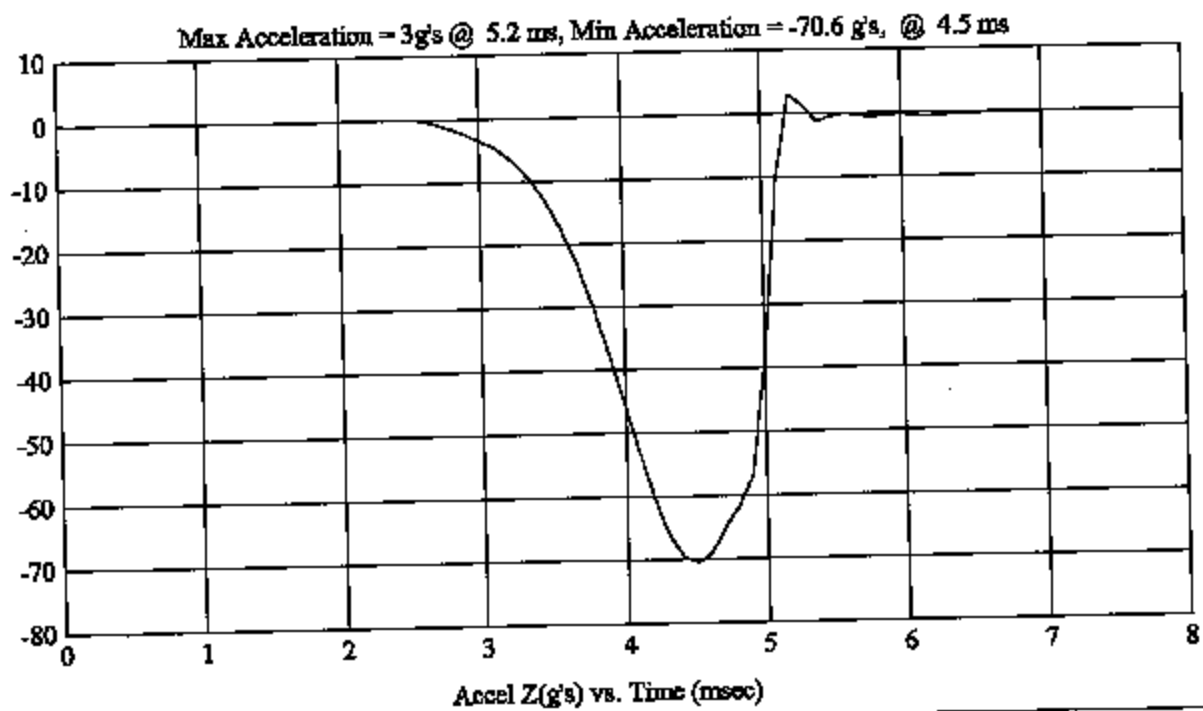
Test Number: H36271

MGA Job Number: G0517-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 36



HEAD DROP TEST SUMMARY
PART 572L

HEADFORM SERIAL NUMBER: <u>036</u> CALIBRATION DATE: <u>11-18-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.98
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	42
Peak Resultant Acceleration	225 G's to 275 G's	245.2
Peak Lateral Acceleration	15 G's Maximum	5.7
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J35923	11-9-04	5-9-05
2	ENDEVCO	7264-2000	J35916	11-9-04	5-9-05
3	ENDEVCO	7264-2000	J35918	11-9-04 ⁴	5-9-05

REMARKS:

RECORDED BY: [Signature]

DATE: 11-18-04

APPROVED BY: [Signature]

Head Drop
(Preliminary Test Report)

4-16

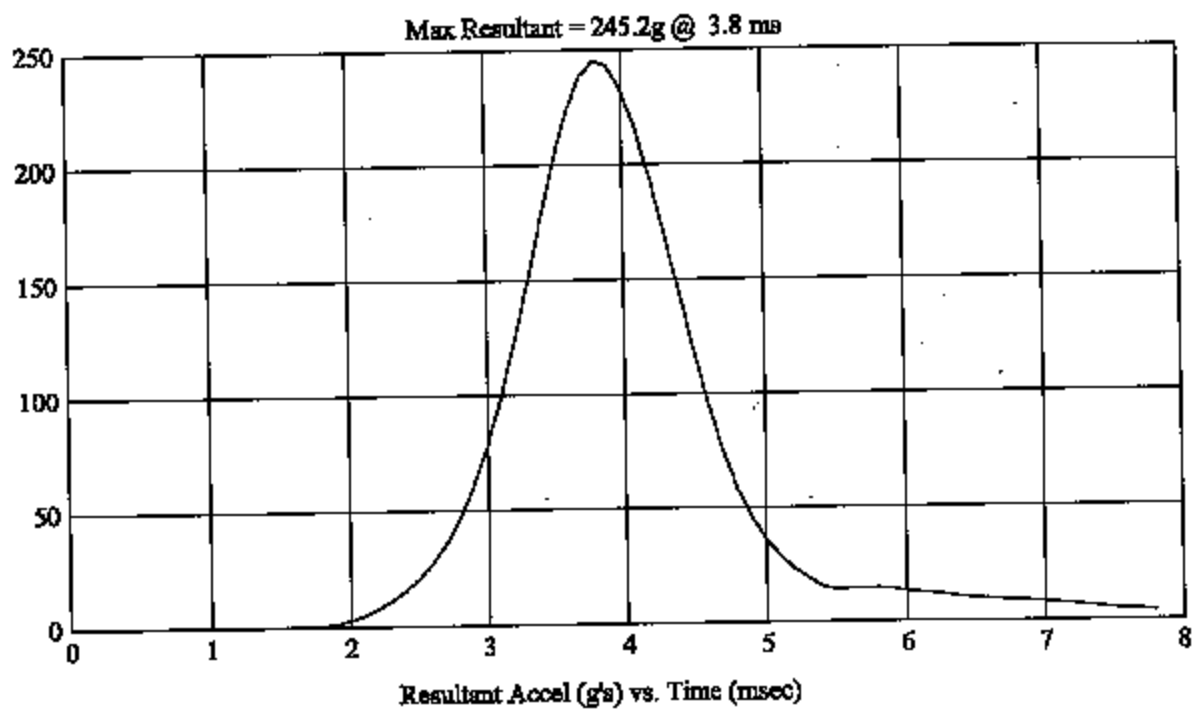
Test Number: H36272

MGA Job Number: G04I7-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 036



Head Drop
(Preliminary Test Report)

4-17

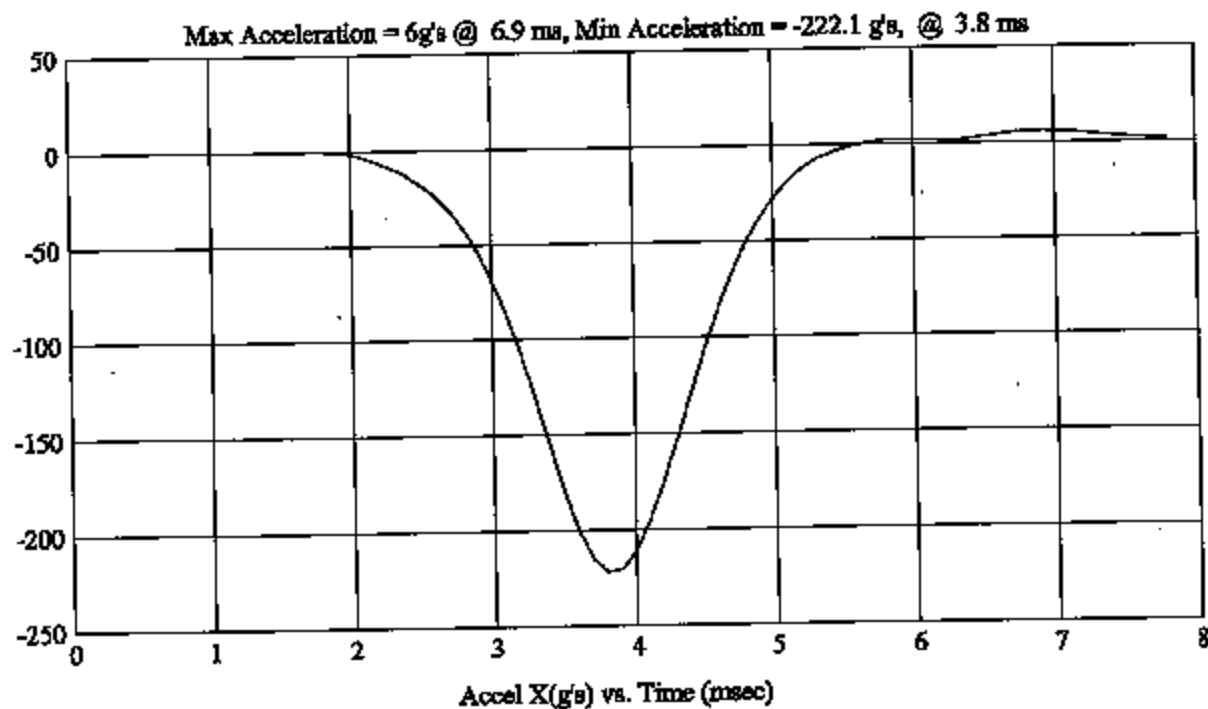
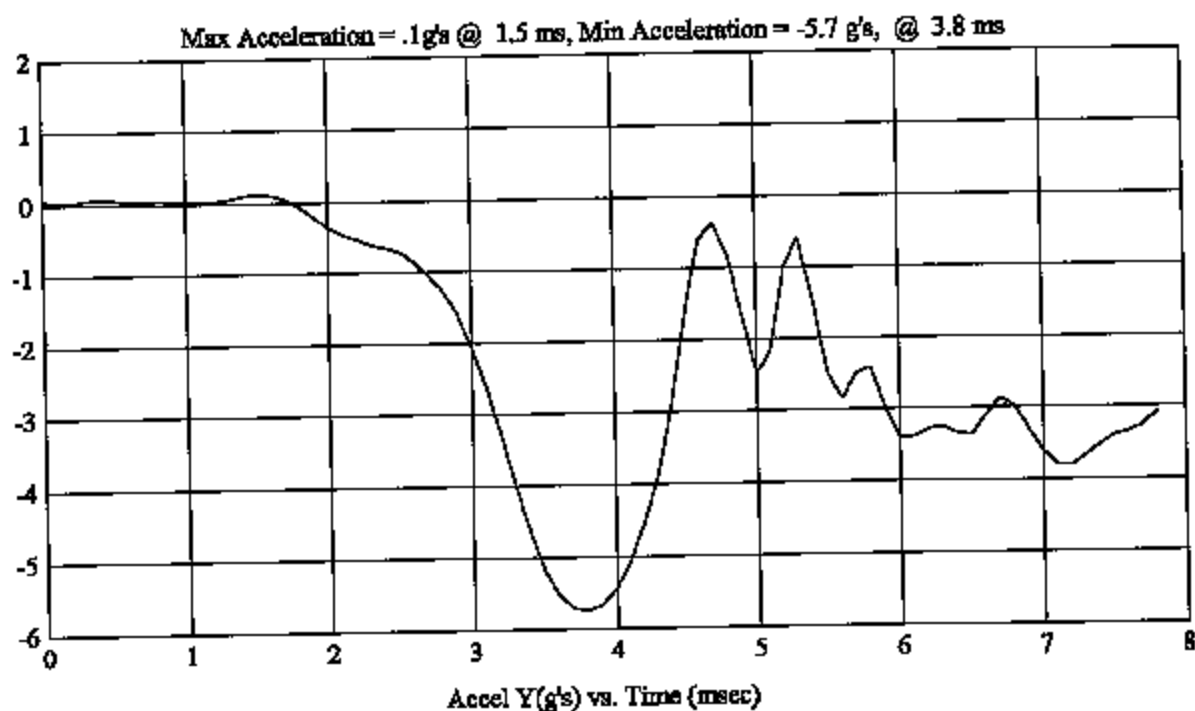
Test Number: H36272

MGA Job Number: G0417-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 036



Head Drop
(Preliminary Test Report)

4-18

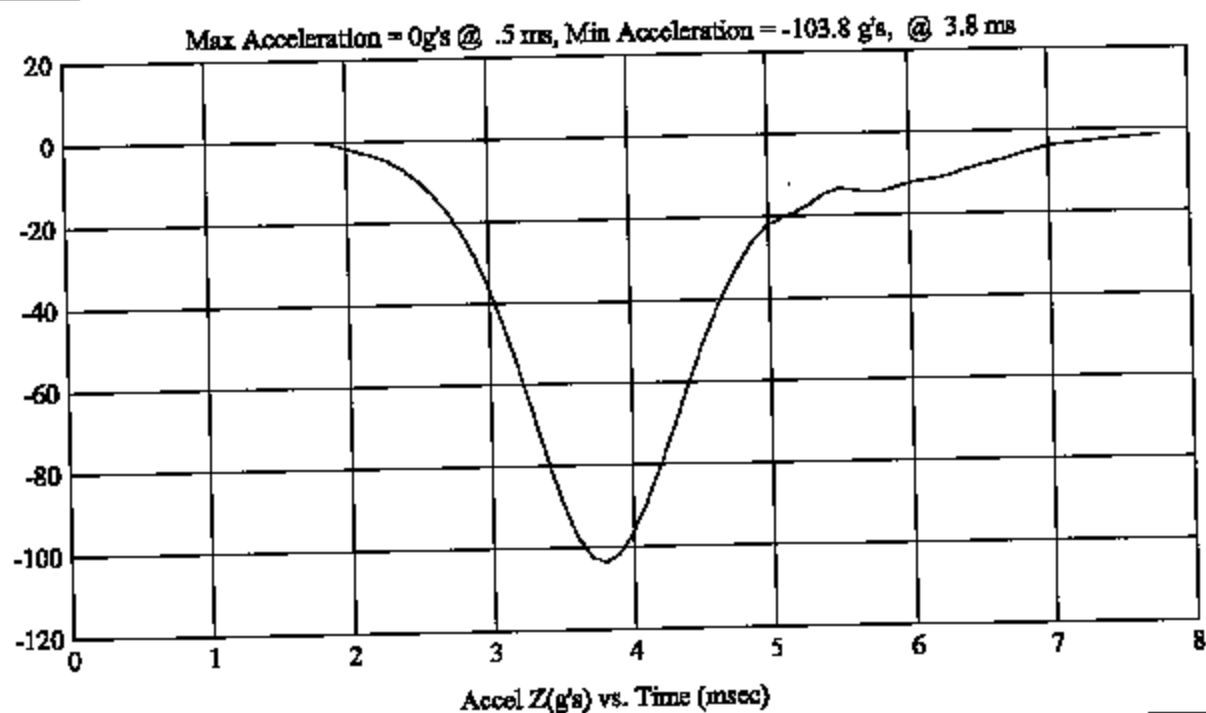
Test Number: H36272

MGA Job Number: G0417-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 036



MICHIGAN OPERATIONS
DATE: 3/2003
SUPERCEDES: MGATPHDT.5

DOC. NO.: MGATF201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>37</u>		CALIBRATION DATE: <u>11/16/04</u>
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	23°
Relative Humidity	10% to 70%	28%
Peak Resultant Acceleration	225 G's to 275 G's	267.1
Peak Lateral Acceleration	15 G's Maximum	10.1
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
X	ENDEVCO	7264-2000	J35800	11-09-04	5-09-05
Y	ENDEVCO	7264-2000	J35891	11-09-04	5-09-05
Z	ENDEVCO	7264-2000	J35791	11-09-04	5-09-05

REMARKS:

RECORDED BY:

DATE:

APPROVED BY:

Head Drop
(Preliminary Test Report)

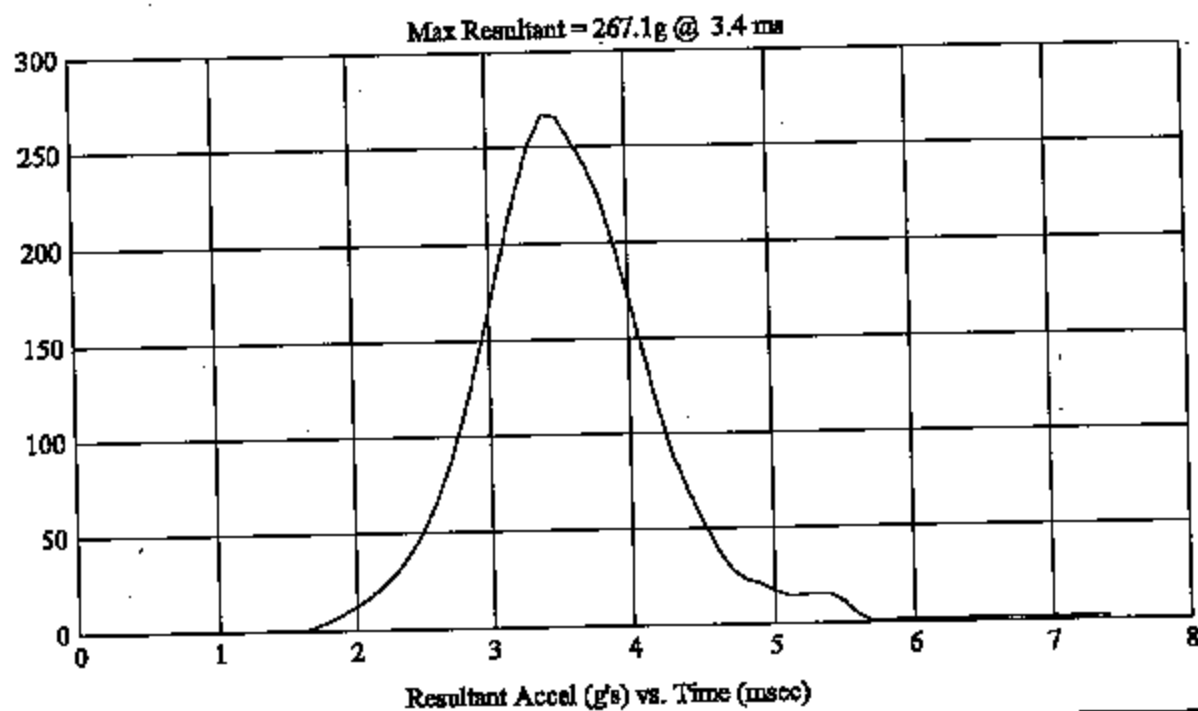
Test Number: H37144

MGA Job Number: G0517-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 37



Head Drop
(Preliminary Test Report)

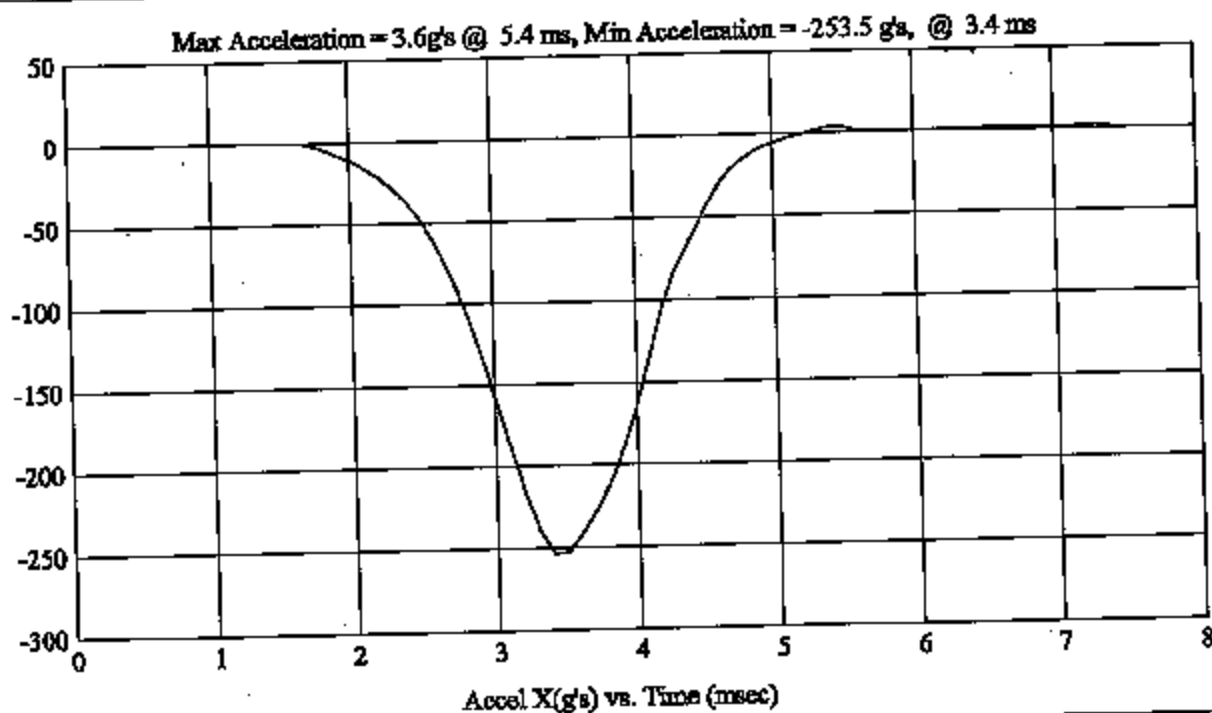
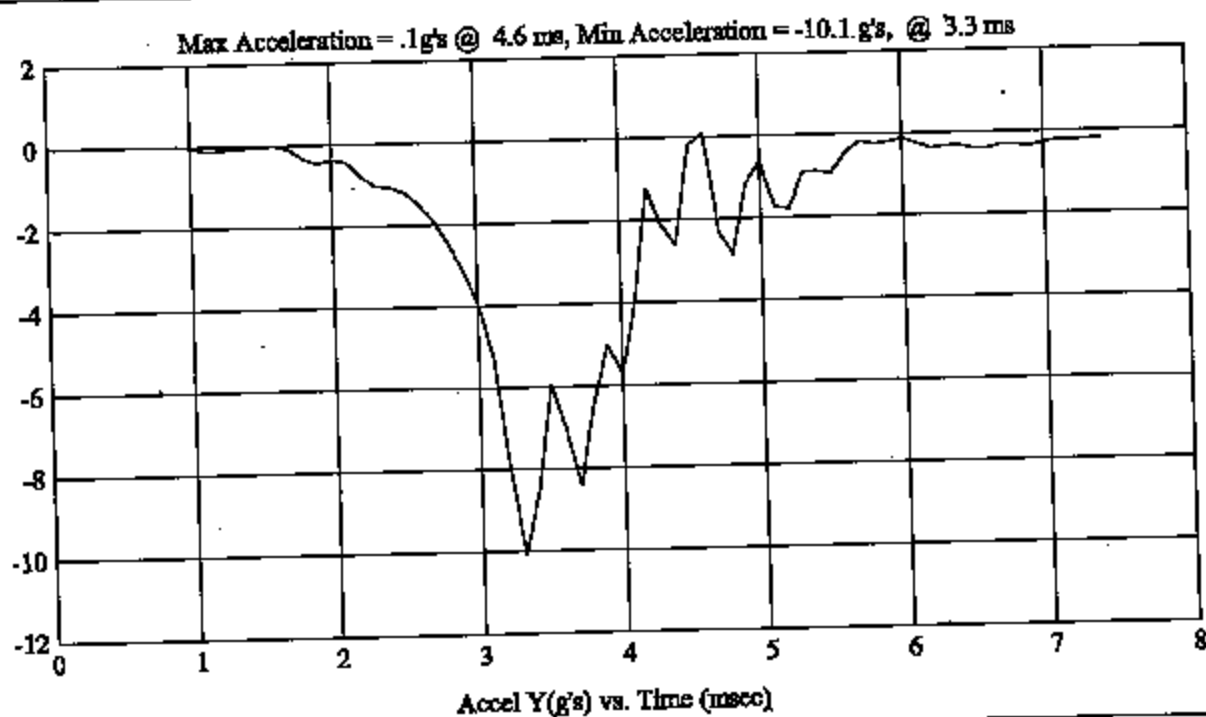
Test Number: H37144

MGA Job Number: G0517-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 37



Head Drop
(Preliminary Test Report)

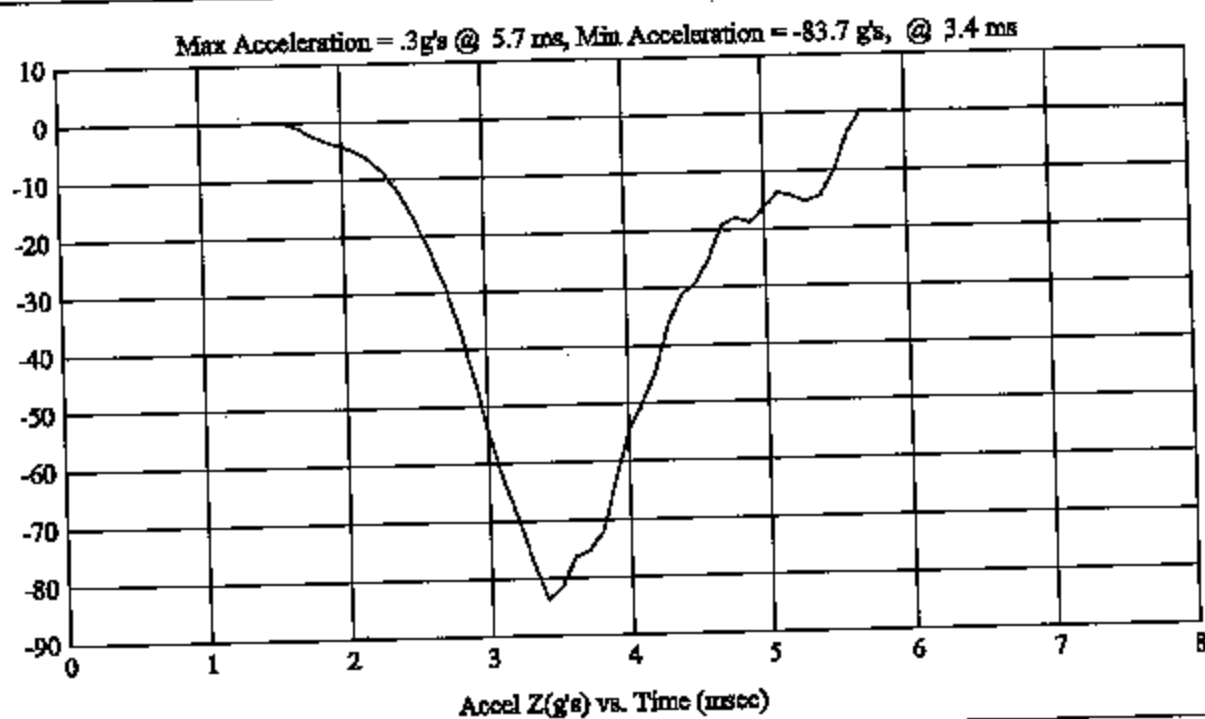
Test Number: H37144

MGA Job Number: G0517-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 37



MICHIGAN OPERATIONS
DATE: 3/20/03
SUPERCEDES: MGATPHDT.5

DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>037</u> CALIBRATION DATE: <u>11-18-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.96
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	44
Peak Resultant Acceleration	225 G's to 275 G's	266.2
Peak Lateral Acceleration	15 G's Maximum	14.8
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
X 1	ENDEVCO	7264-2000	535800	11-9-04	5-9-05
Y 2	ENDEVCO	7264-2000	535841	11-9-04	5-9-05
Z 3	ENDEVCO	7264-2000	535791	11-9-04	5-9-05

REMARKS:

RECORDED BY: [Signature]

DATE: 11-18-04

APPROVED BY: [Signature]

Head Drop
(Preliminary Test Report)

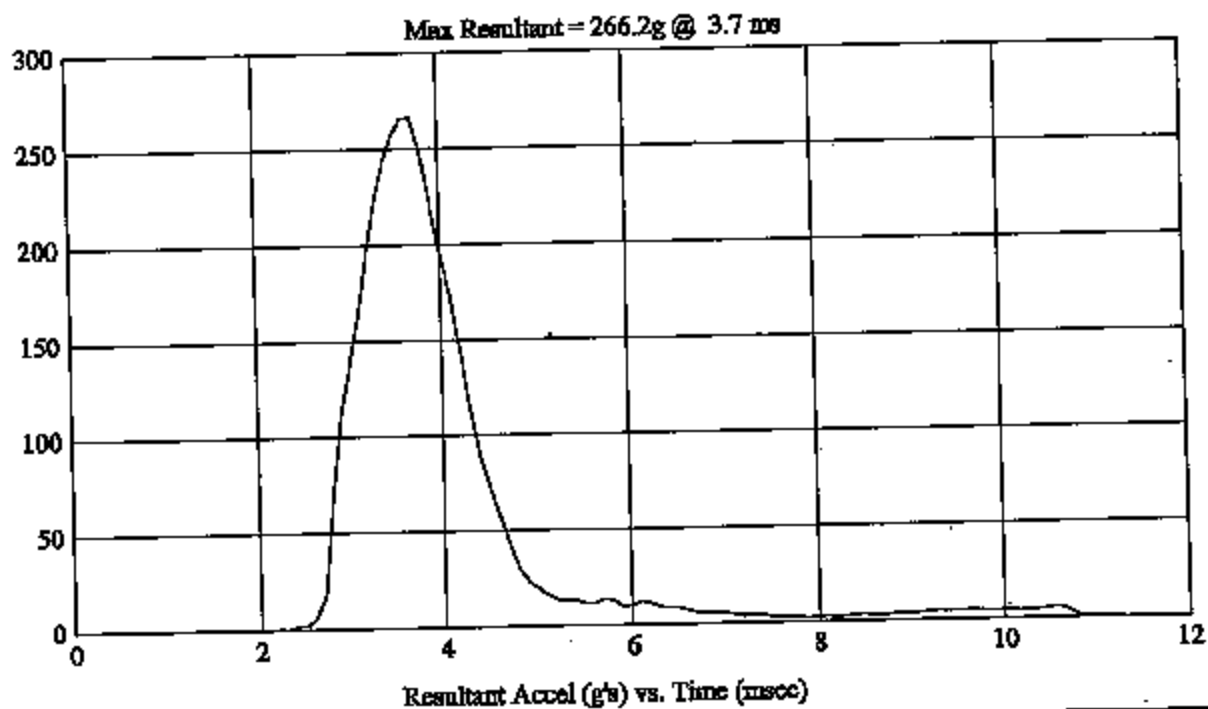
Test Number: H37145

MGA Job Number: G0517-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 37



Head Drop
(Preliminary Test Report)

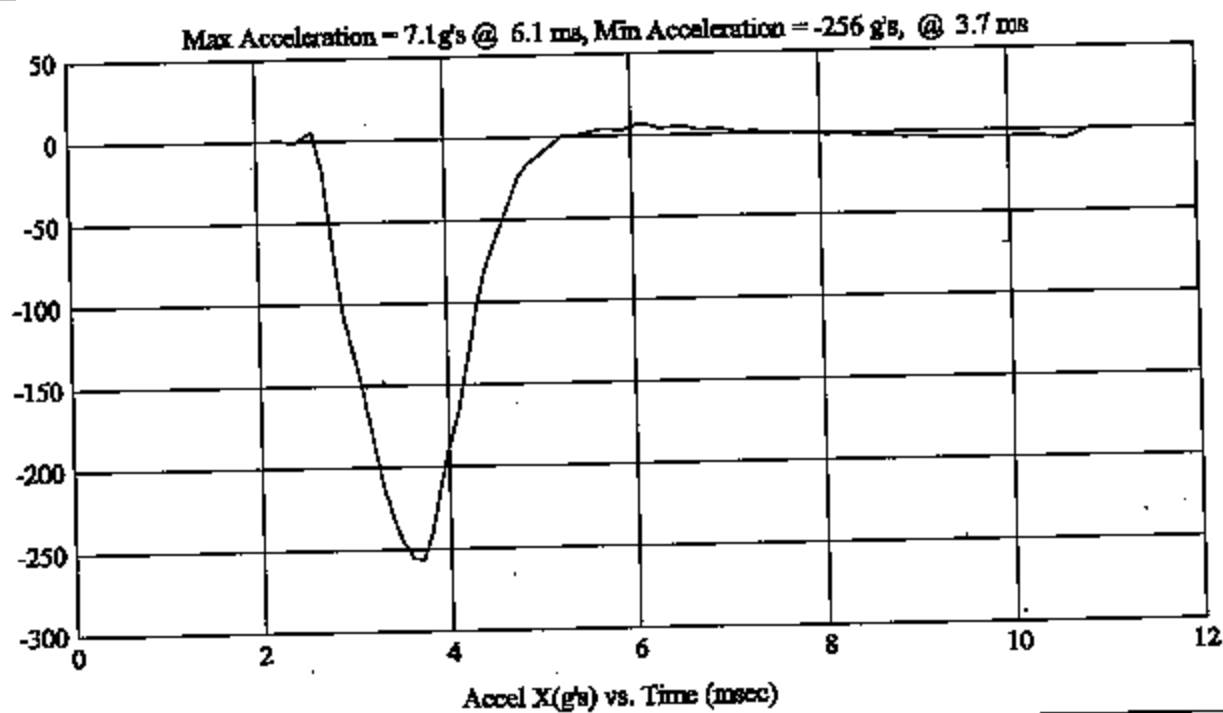
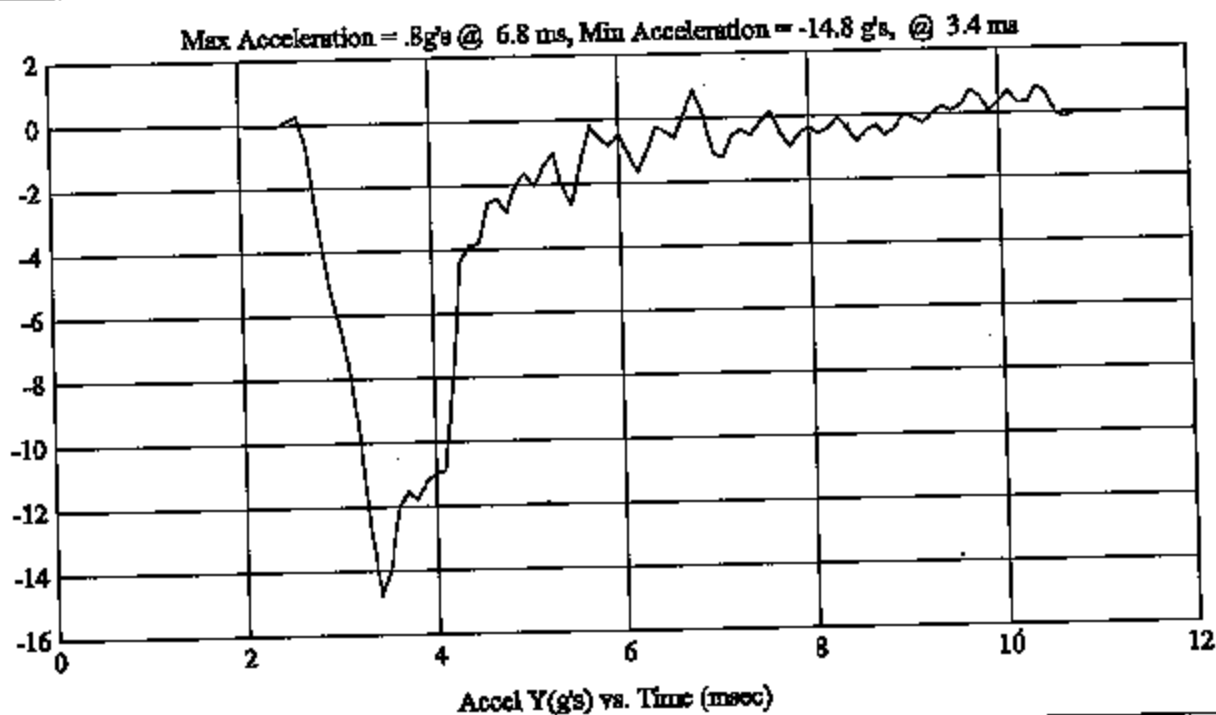
Test Number: H37145

MGA Job Number: G0517-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 37



Head Drop
(Preliminary Test Report)

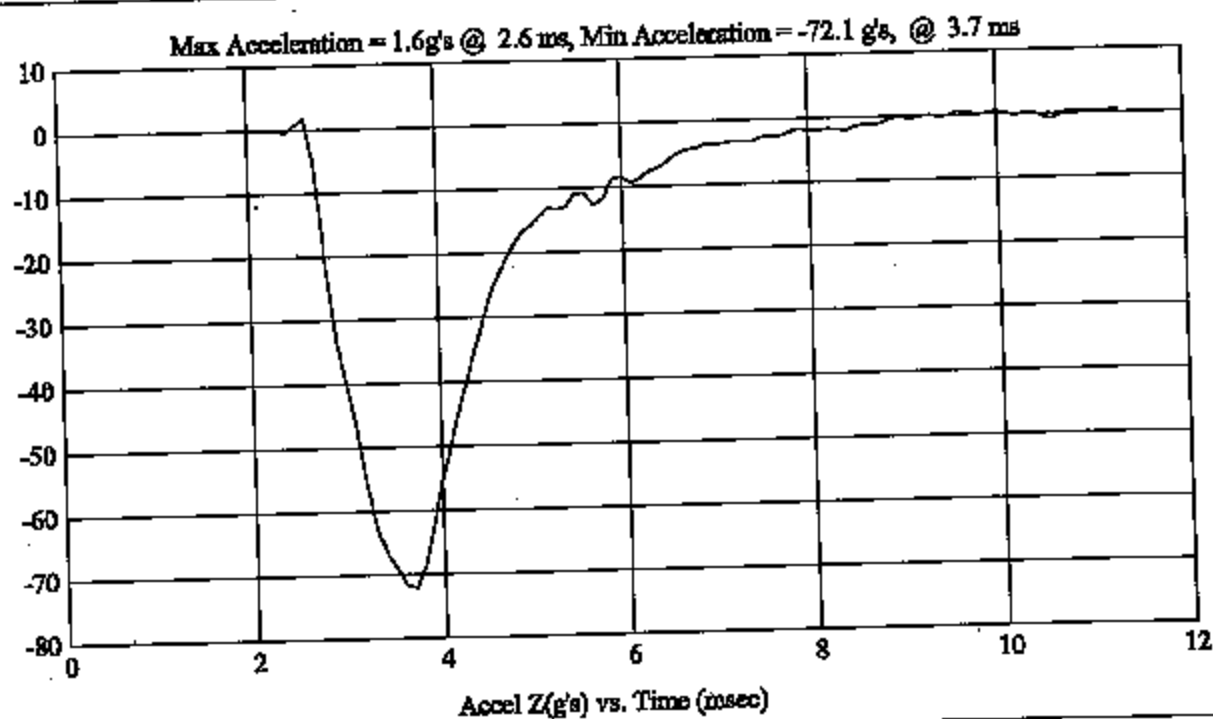
Test Number: H37145

MGA Job Number: G05I7-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 37



MICHIGAN OPERATIONS
DATE: 3/20/03
SUPERSEDES: MQATPHDT.5

DOC. NO.: MQATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>38</u>		CALIBRATION DATE: <u>11/16/04</u>
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	28
Peak Resultant Acceleration	225 G's to 275 G's	241.4
Peak Lateral Acceleration	15 G's Maximum	6.1
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	J36197	11/09/04	5/09/05
2	ENDEVCO	7264-2000	J36193	11/09/04	5/09/05
3	ENDEVCO	7264-2000	J36353	11/09/04	5/09/05

REMARKS:

RECORDED BY: DATE: 11/16/04APPROVED BY: 

Head Drop
(Preliminary Test Report)

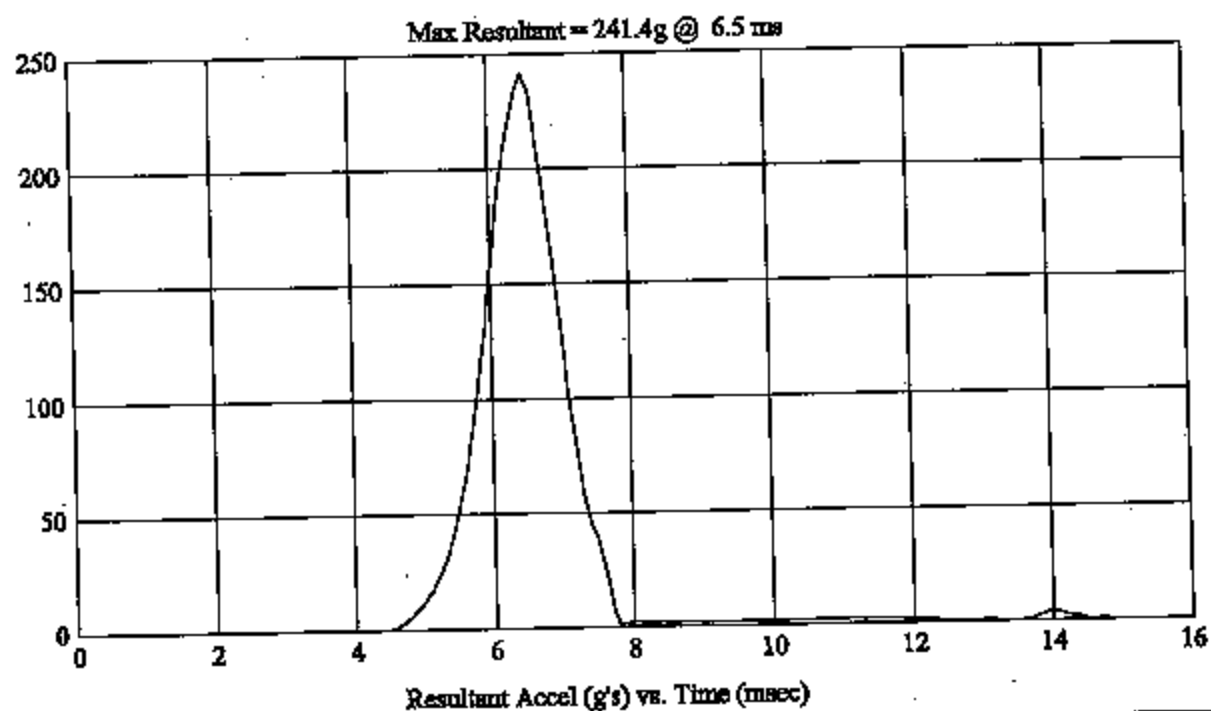
Test Number: E38253

MGA Job Number: G04I7-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

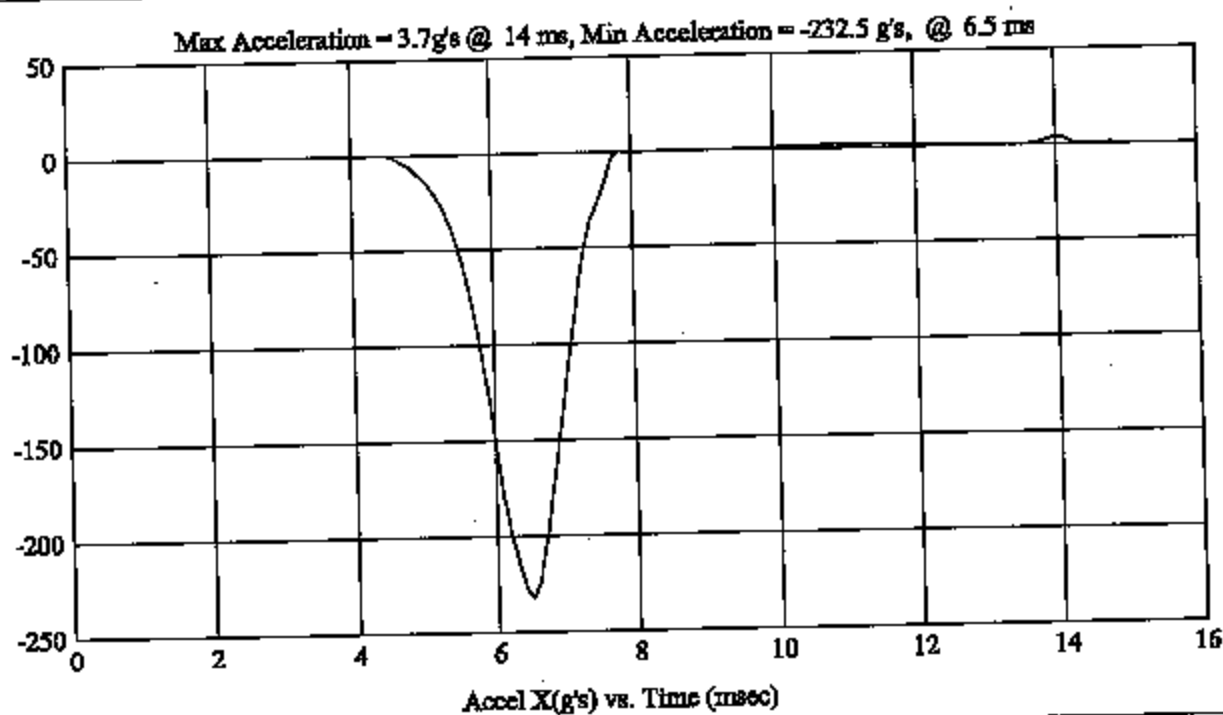
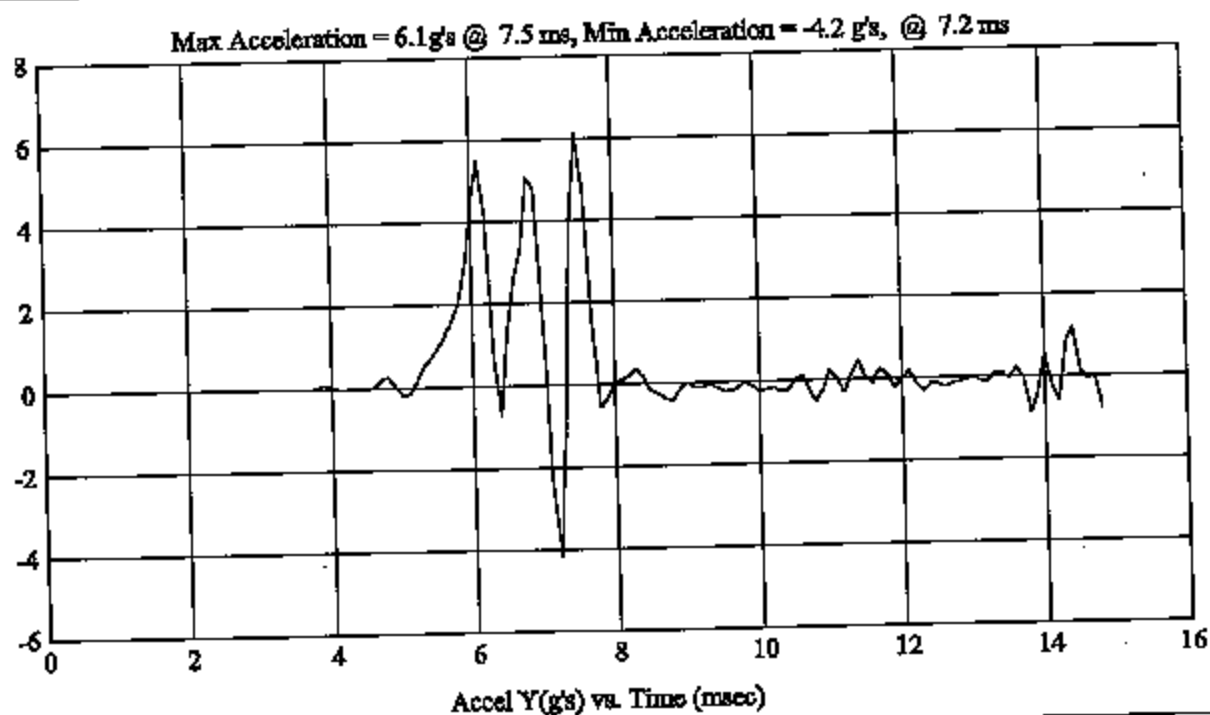
Test Number: H38253

MGA Job Number: G04I7-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

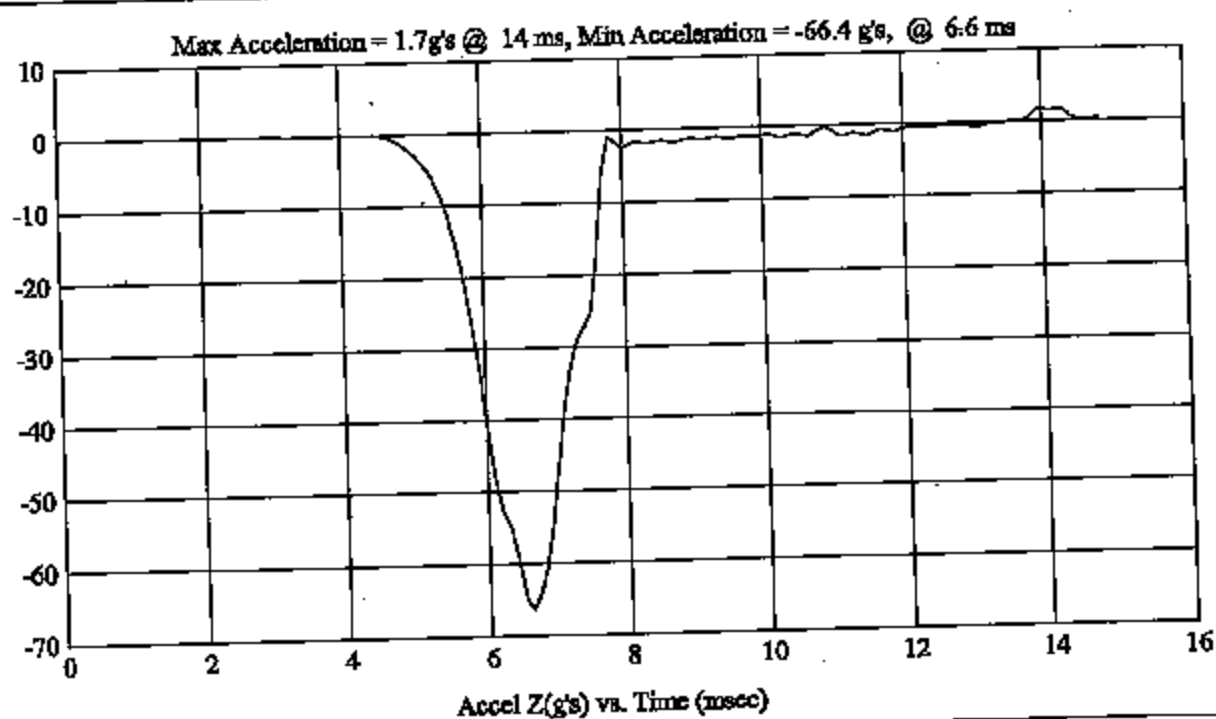
Test Number: H38253

MGA Job Number: G0417-001.1

Test Date: 11/16/04

Test Description: Pre - Test Calibration

Head #: 38



MICHIGAN OPERATIONS
DATE: 3/20/03
SUPERCEDES: MGATPHDT.5

DOC. NO.: MGATP201UHD
REVISION NO.: 6
PAGE 6 OF 7

HEAD DROP TEST SUMMARY PART 572L

HEADFORM SERIAL NUMBER: <u>038</u> CALIBRATION DATE: <u>11-18-04</u>		
TEST PARAMETER	SPECIFICATION	TEST RESULTS
Weight	9.90 to 10.10 lbs.	9.92
Temperature	19° C to 26° C	23
Relative Humidity	10% to 70%	44
Peak Resultant Acceleration	225 G's to 275 G's	244.3
Peak Lateral Acceleration	15 G's Maximum	4.5
Unimodal Acceleration Curve	YES	Yes

FMH INSTRUMENTATION					
HEAD ACCELEROMETERS					
Channel Number	Manufacturer	Model Number	Serial Number	Date of Last Calibration	Date of Next Calibration
1	ENDEVCO	7264-2000	536197	11-9-04	5-9-05
2	ENDEVCO	7264-2000	536193	11-9-04	5-9-05
3	ENDEVCO	7264-2000	536353	11-9-04	5-9-05

REMARKS:

RECORDED BY: *[Signature]*

DATE: 11-18-04

APPROVED BY: *[Signature]*

Head Drop
(Preliminary Test Report)

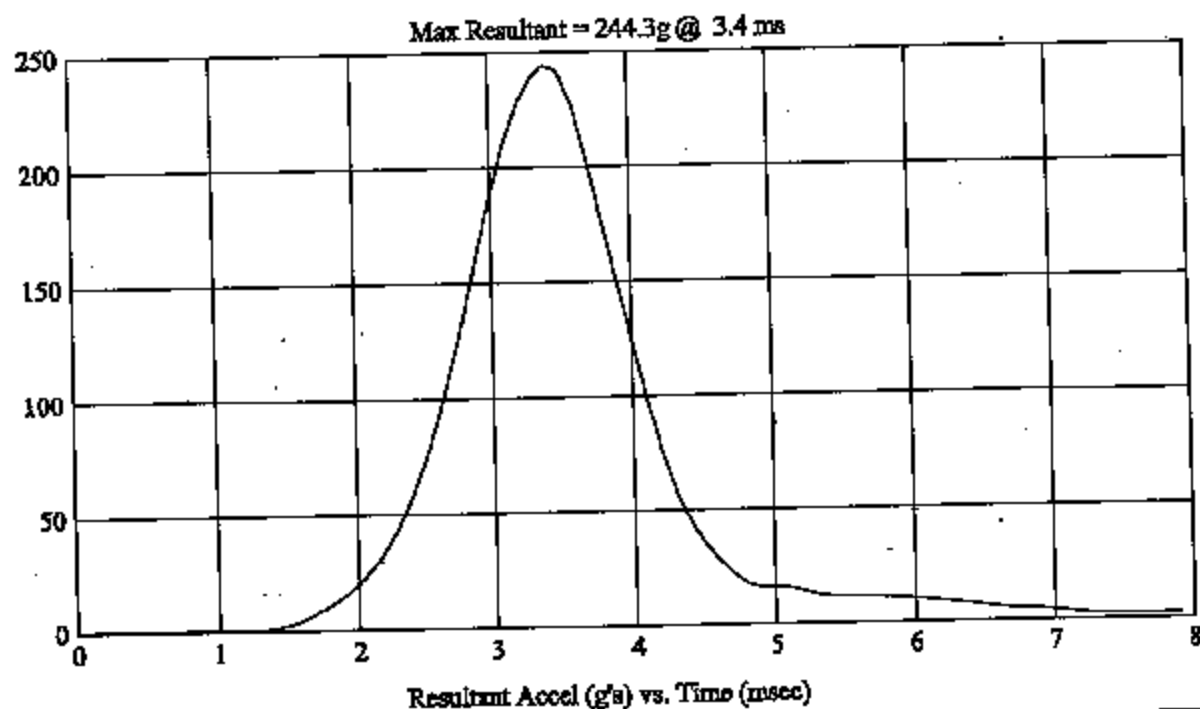
Test Number: H38255

MGA Job Number: G0417-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

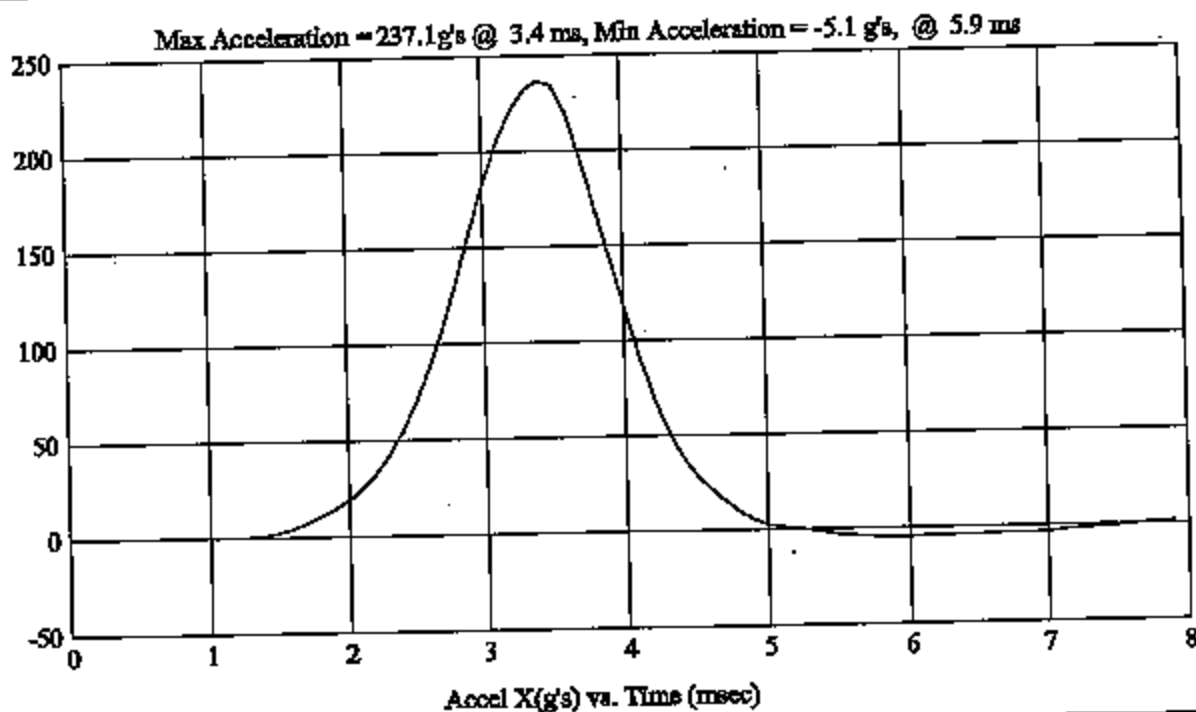
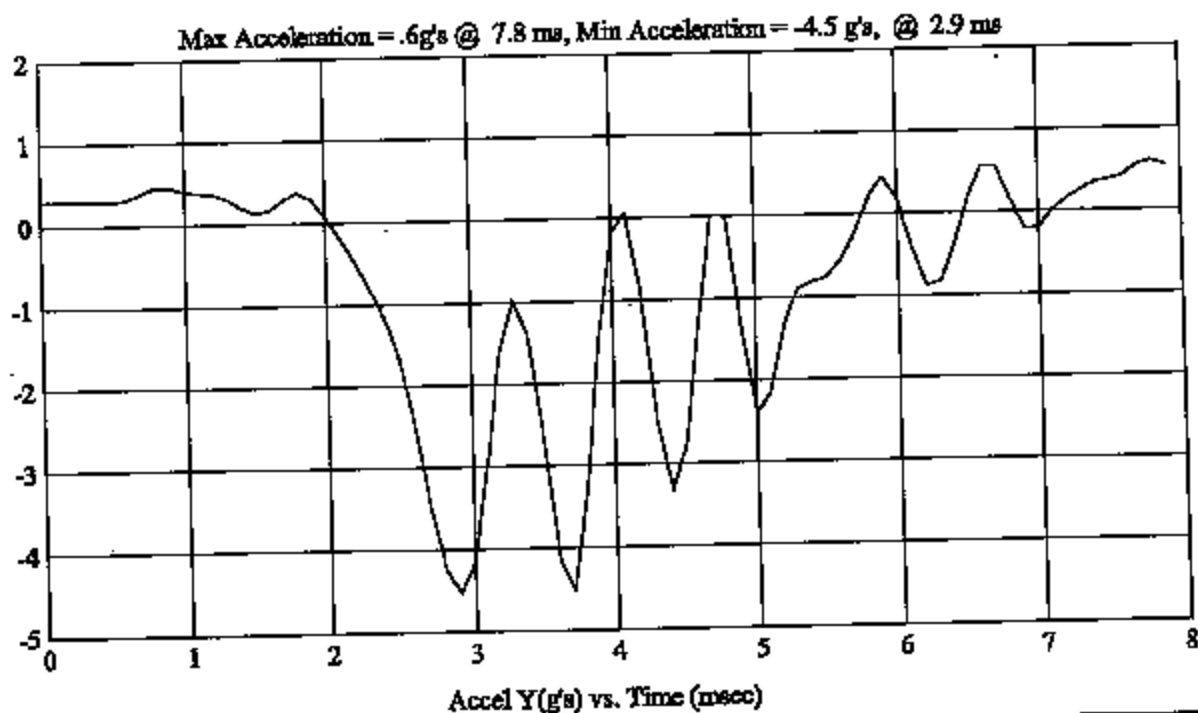
Test Number: H38255

MGA Job Number: G0417-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 38



Head Drop
(Preliminary Test Report)

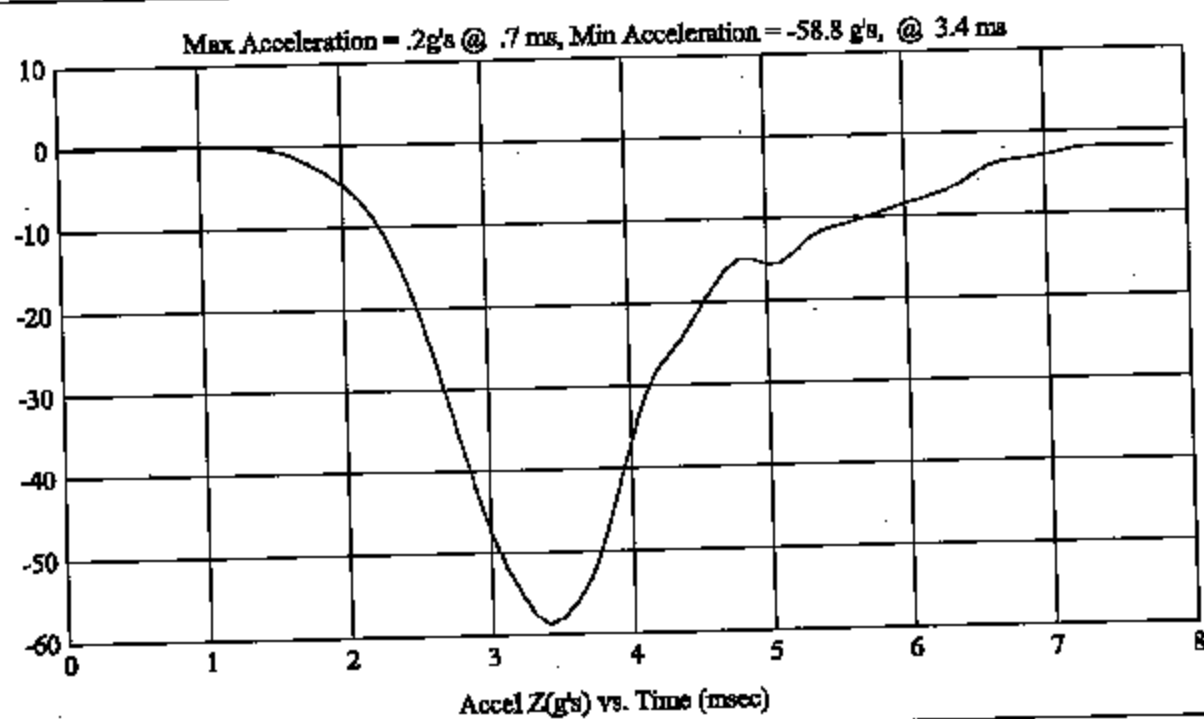
Test Number: H38255

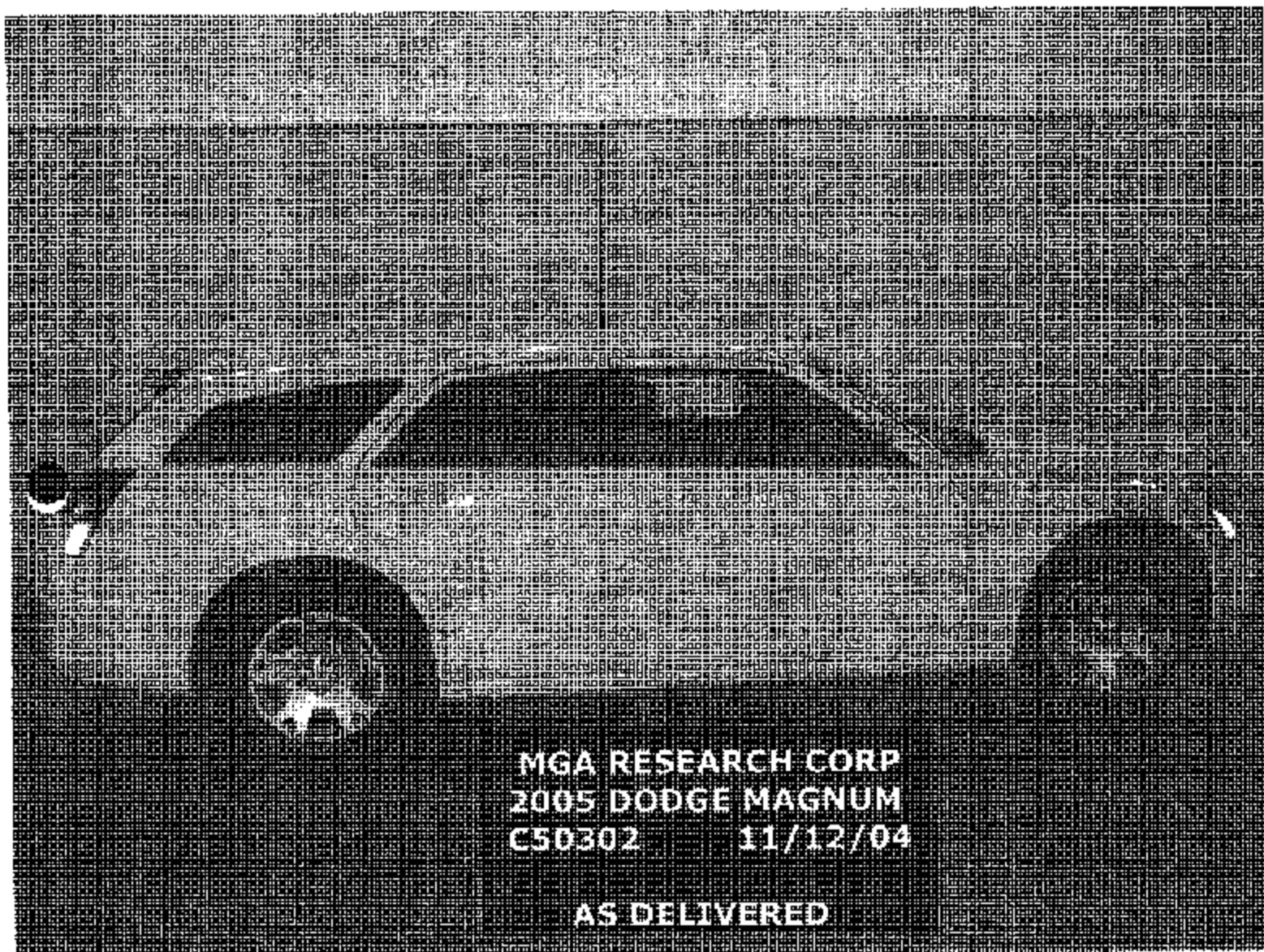
MGA Job Number: G04T7-001.1

Test Date: 11/18/04

Test Description: Post - Test Calibration

Head #: 38





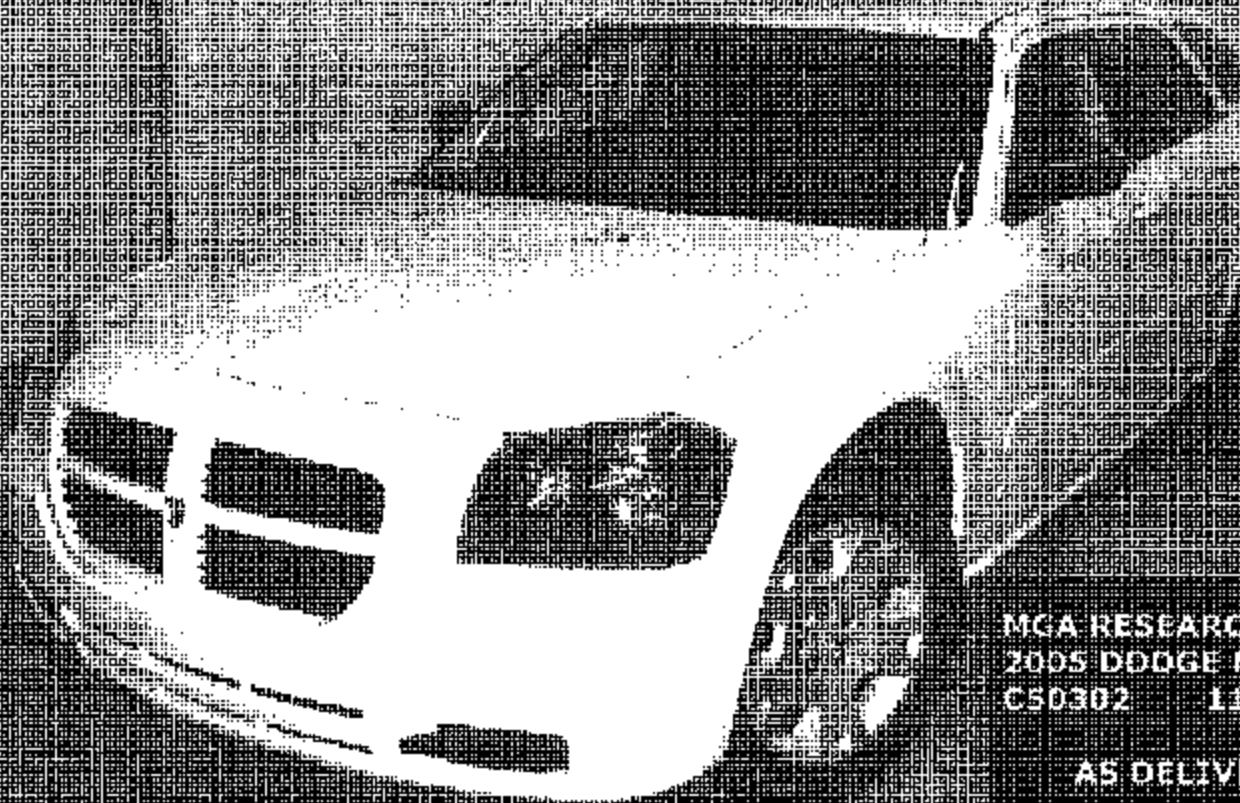
MGA RESEARCH CORP
2005 DODGE MAGNUM
C50302 11/12/04

AS DELIVERED



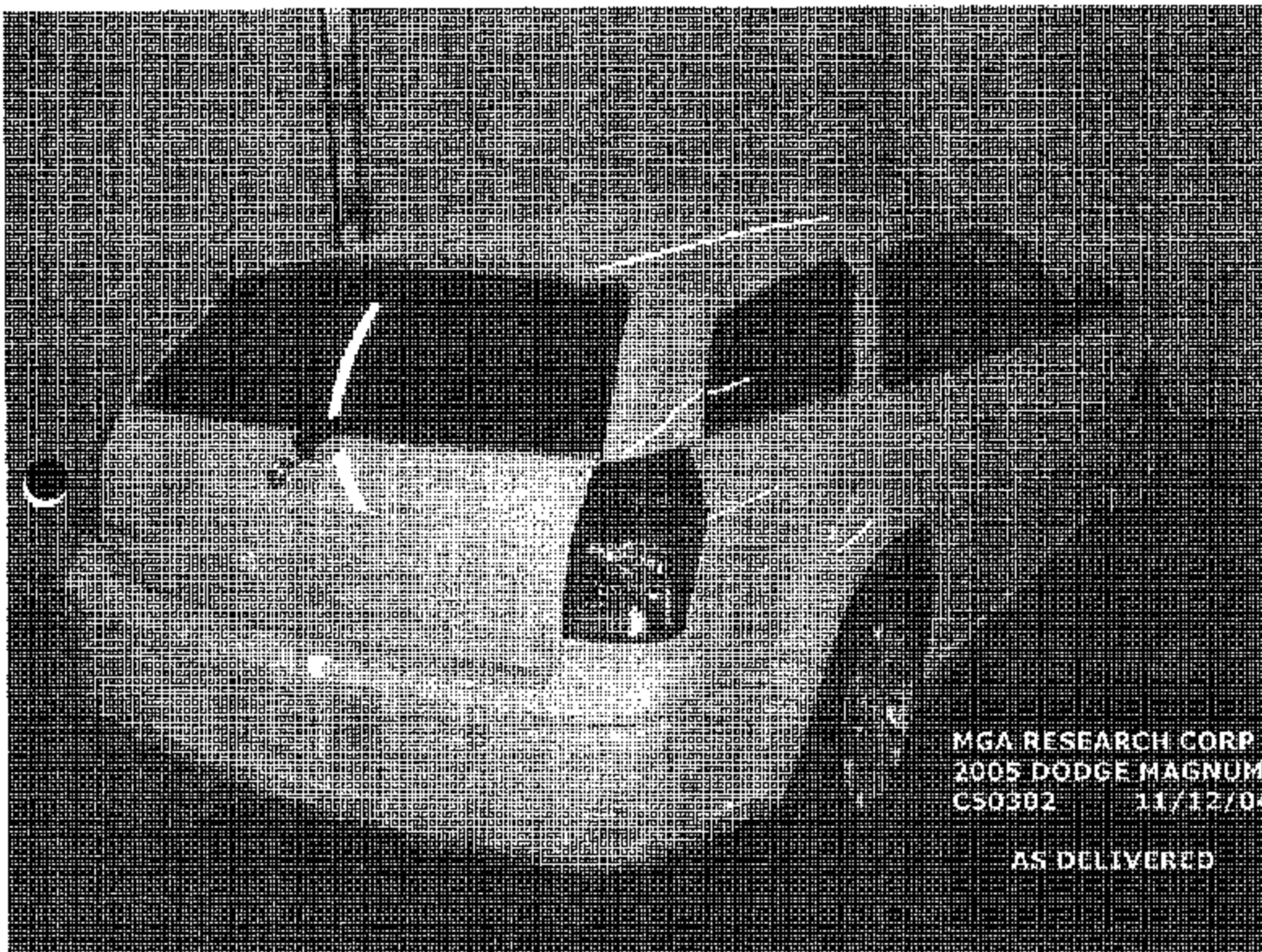
MGA RESEARCH CORP
2005 DODGE MAGNUM
C50302 11/12/04

AS DELIVERED



MGA RESEARCH CORP
2005 DODGE MAGNUM
C50302 11/13/04

AS DELIVERED



MGA RESEARCH CORP
2005 DODGE MAGNUM
CS0302 11/12/04

AS DELIVERED

ED BY DUNLAP-HAYLER CORPORATION

DATE OF 1953 1-10-53

WHR 2225 KG
14935 LB

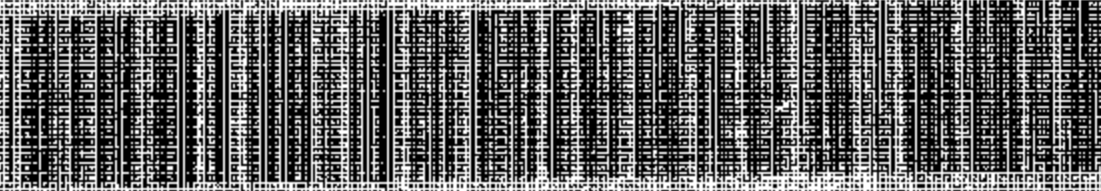
WHR 1231 KG
14935 LB

WHR 1231 KG
14935 LB

THIS OFFICE COMPLIES TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL
HEALTH REGULATIONS AND STANDARDS IN EFFECT AT THE TIME OF THE ABOVE

DATE: 2/4/53 15:513493

DATE: 1-10-53



DATE: 1-10-53 15:513493

DATE: 1-10-53 15:513493



TIRE AND LOADING INFORMATION

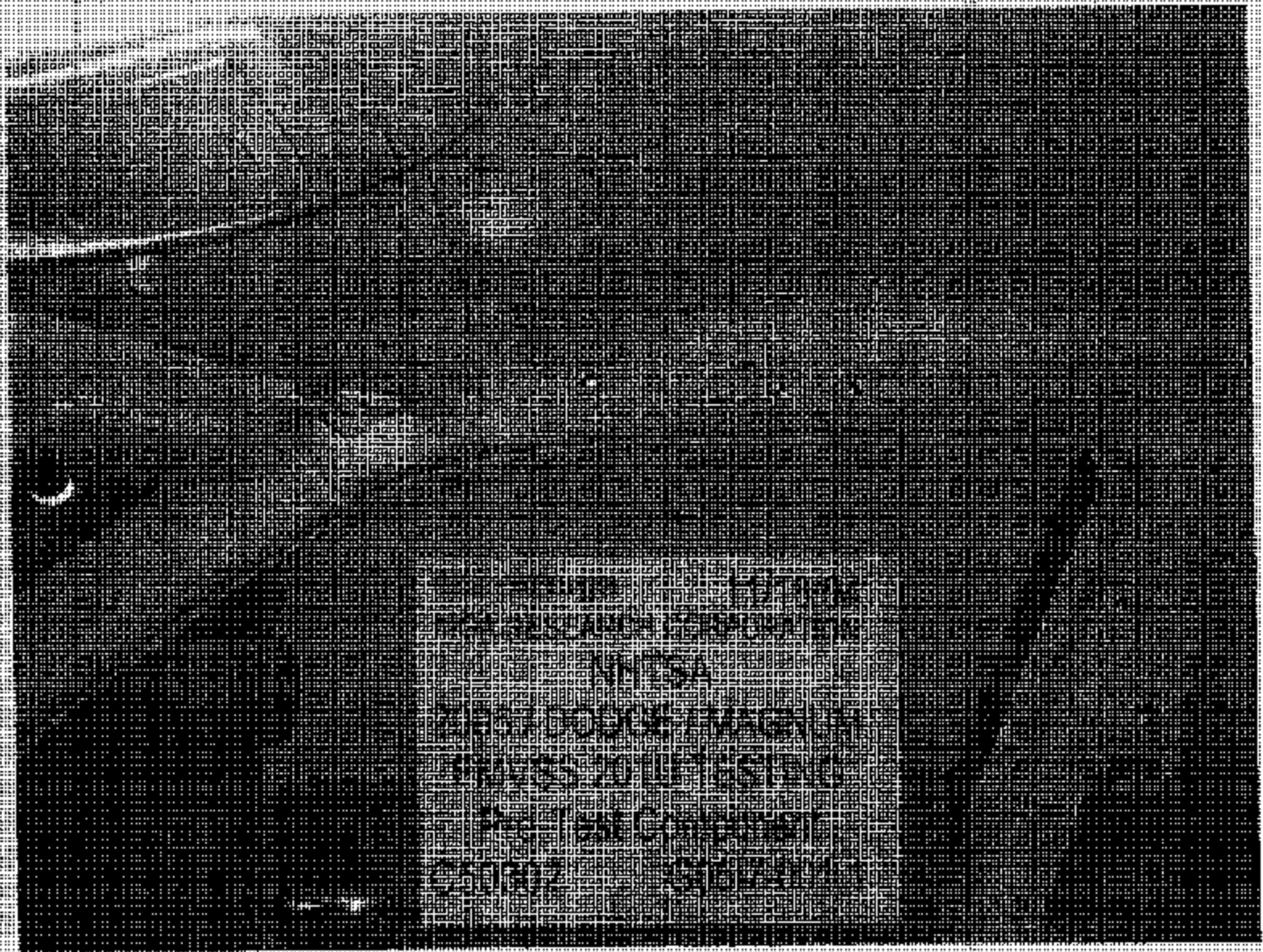
SEATING CAPACITY - TOTAL **5** FRONT **2** REAR **3**

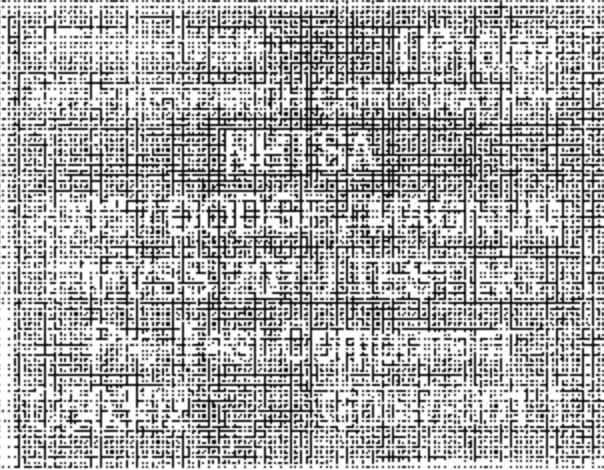
THE COMBINED WEIGHT OF OCCUPANTS AND CARGO SHOULD NEVER EXCEED
392 KG OR 865 LB

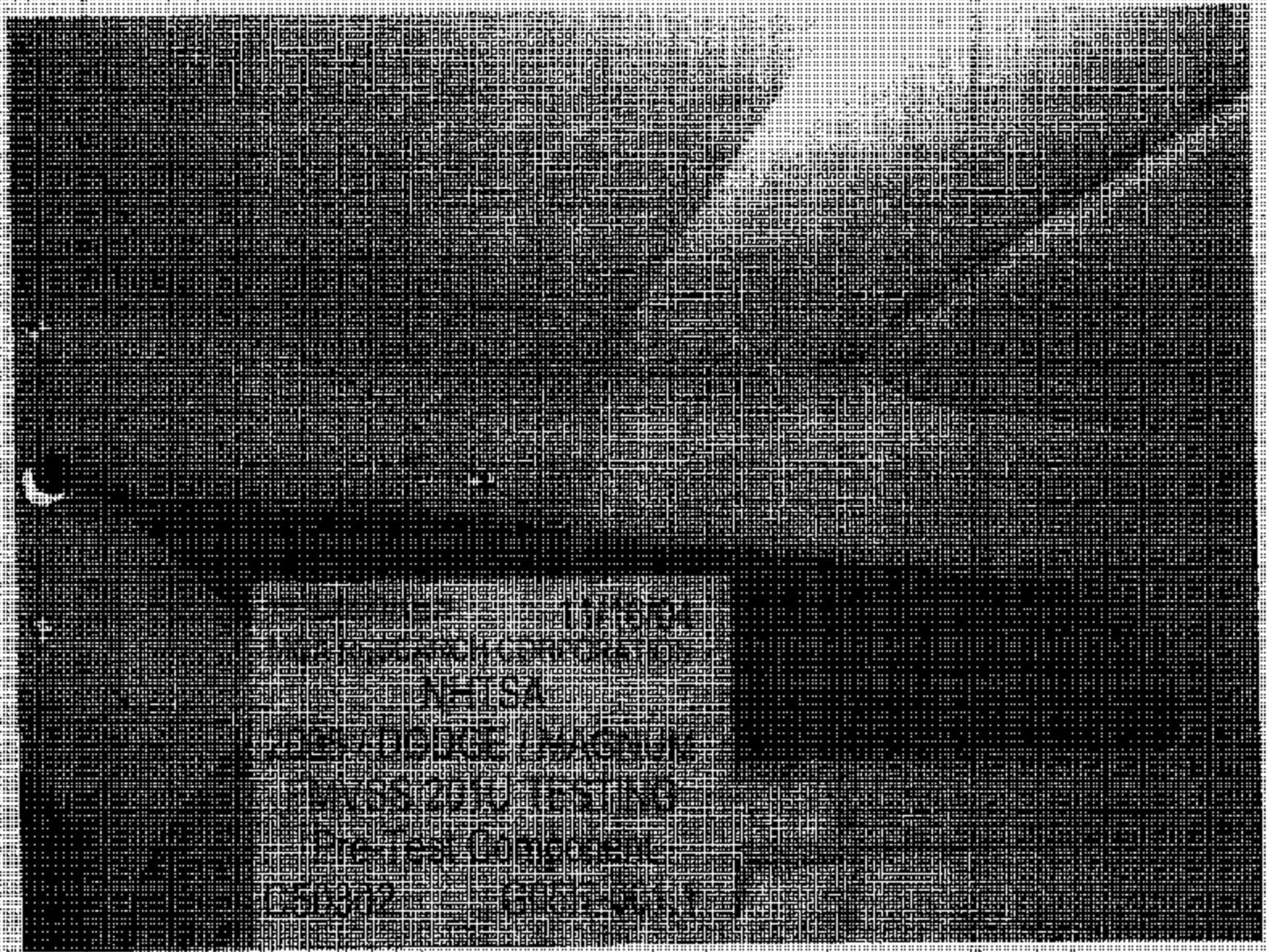
TIRE	FRONT	REAR	SPARE
ORIGINAL TIRE SIZE	P215/65R17	P215/65R17	T135/60D17
COLD TIRE INFLATION PRESSURE	210 kPa, 30 PSI	210 kPa, 30 PSI	420 kPa, 60 PSI

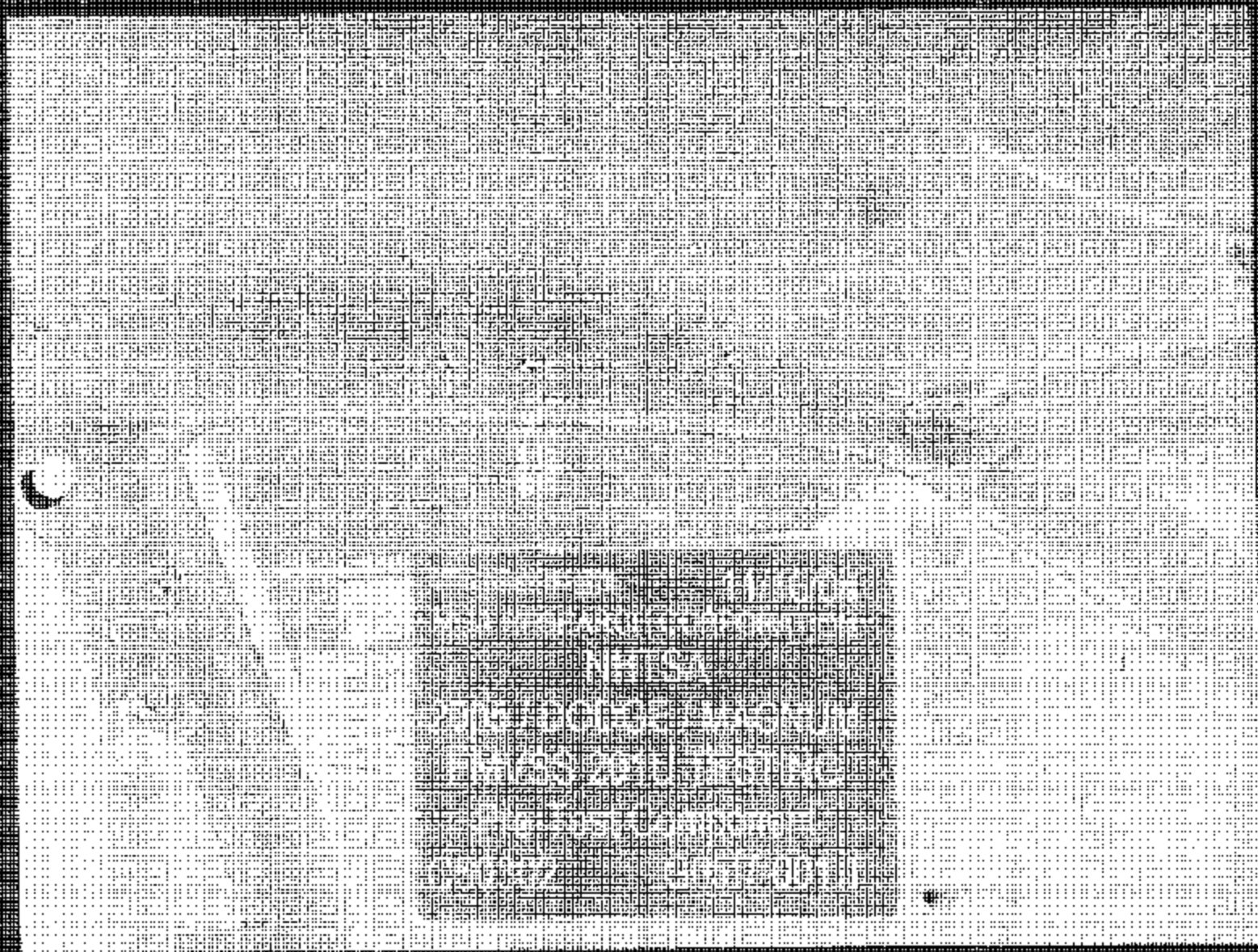
SEE OWNERS MANUAL FOR ADDITIONAL INFORMATION

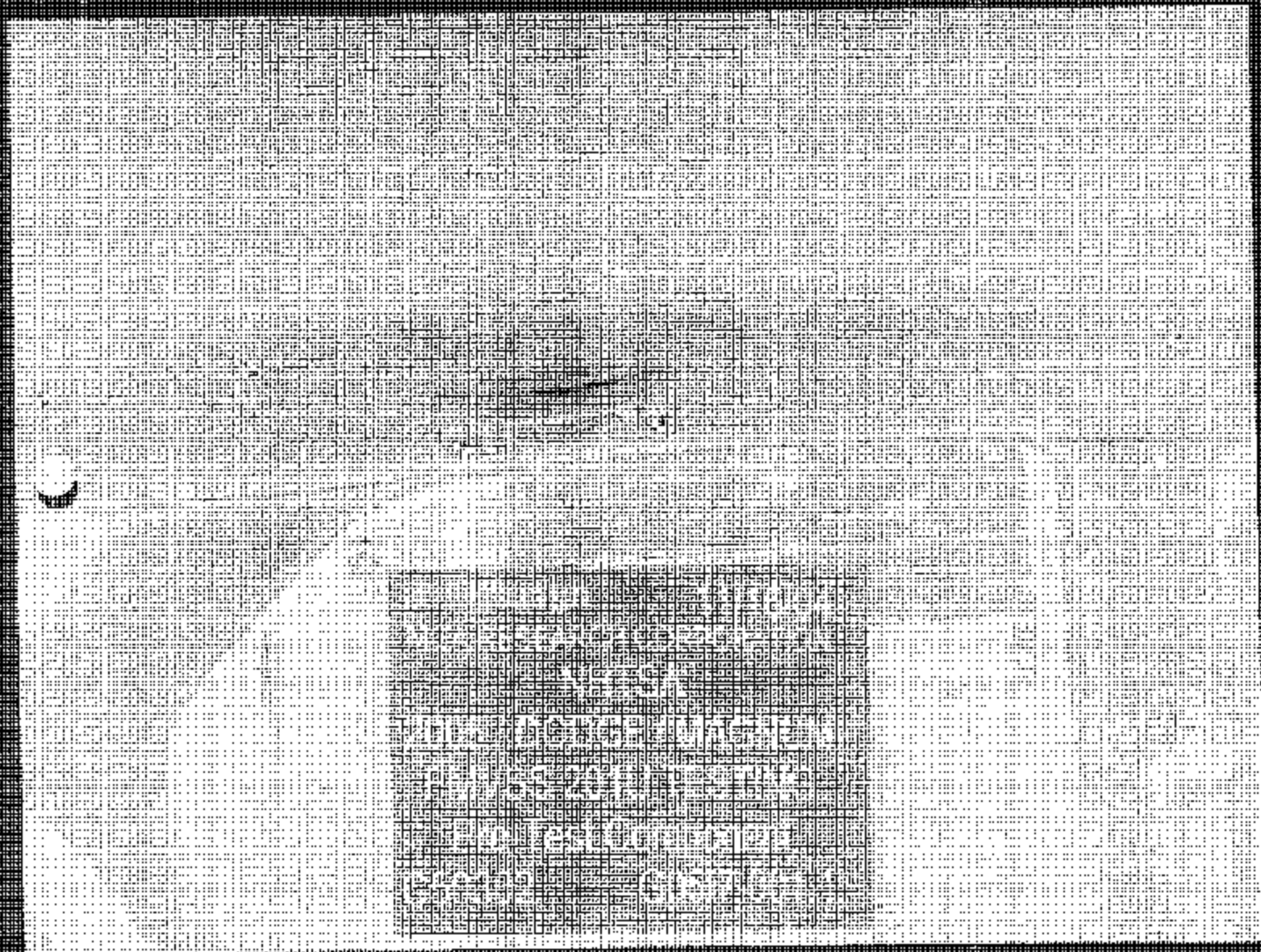
50513499

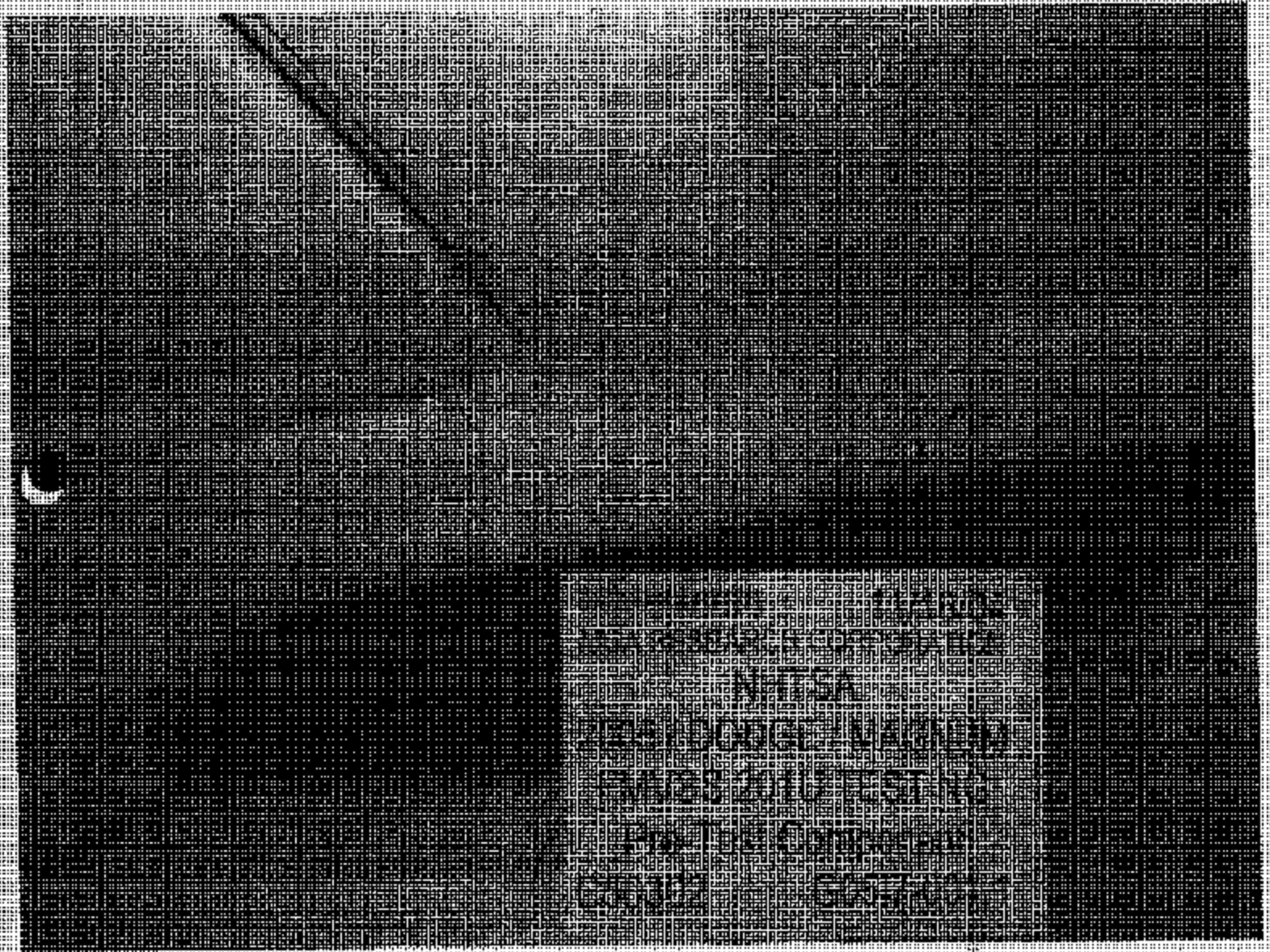


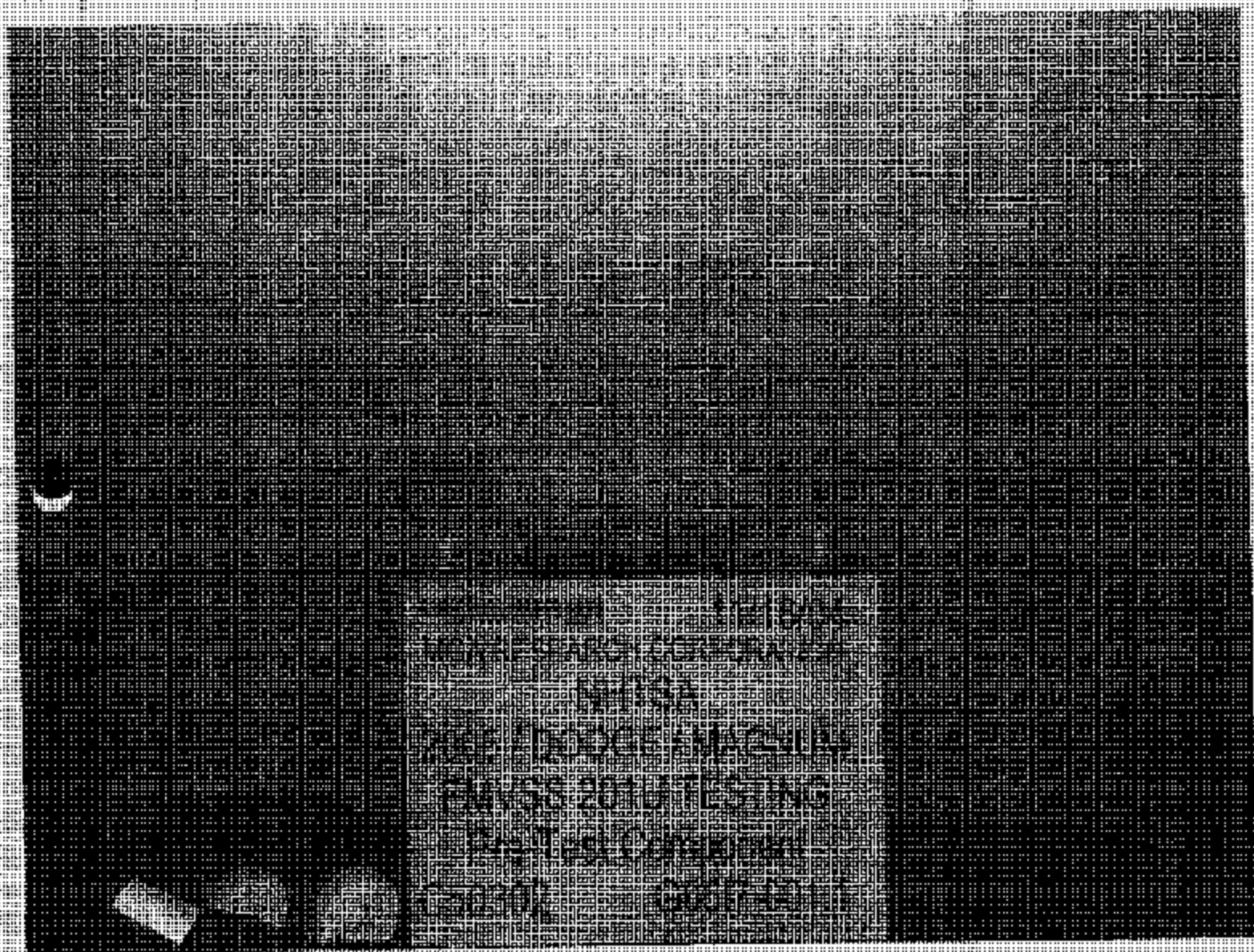


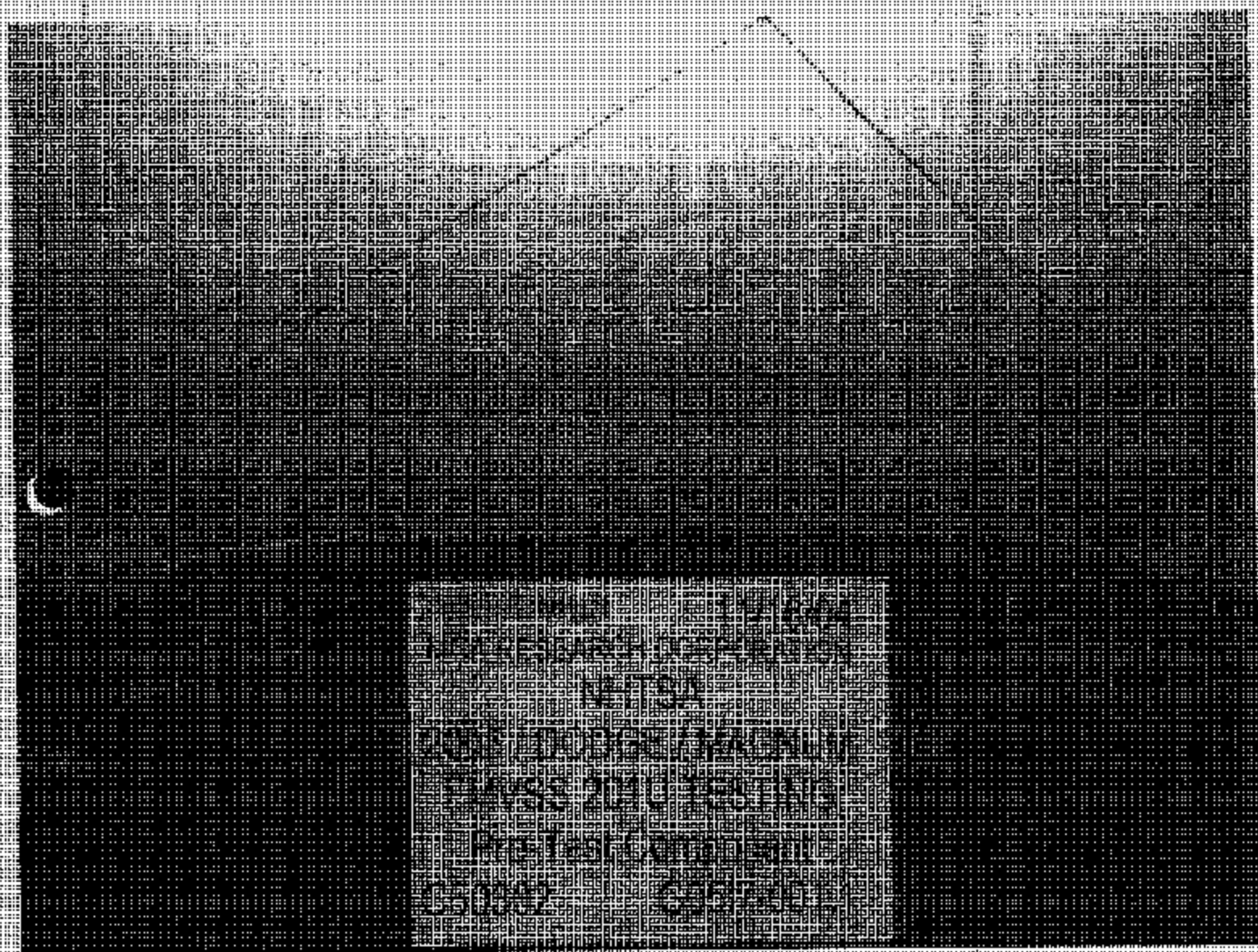




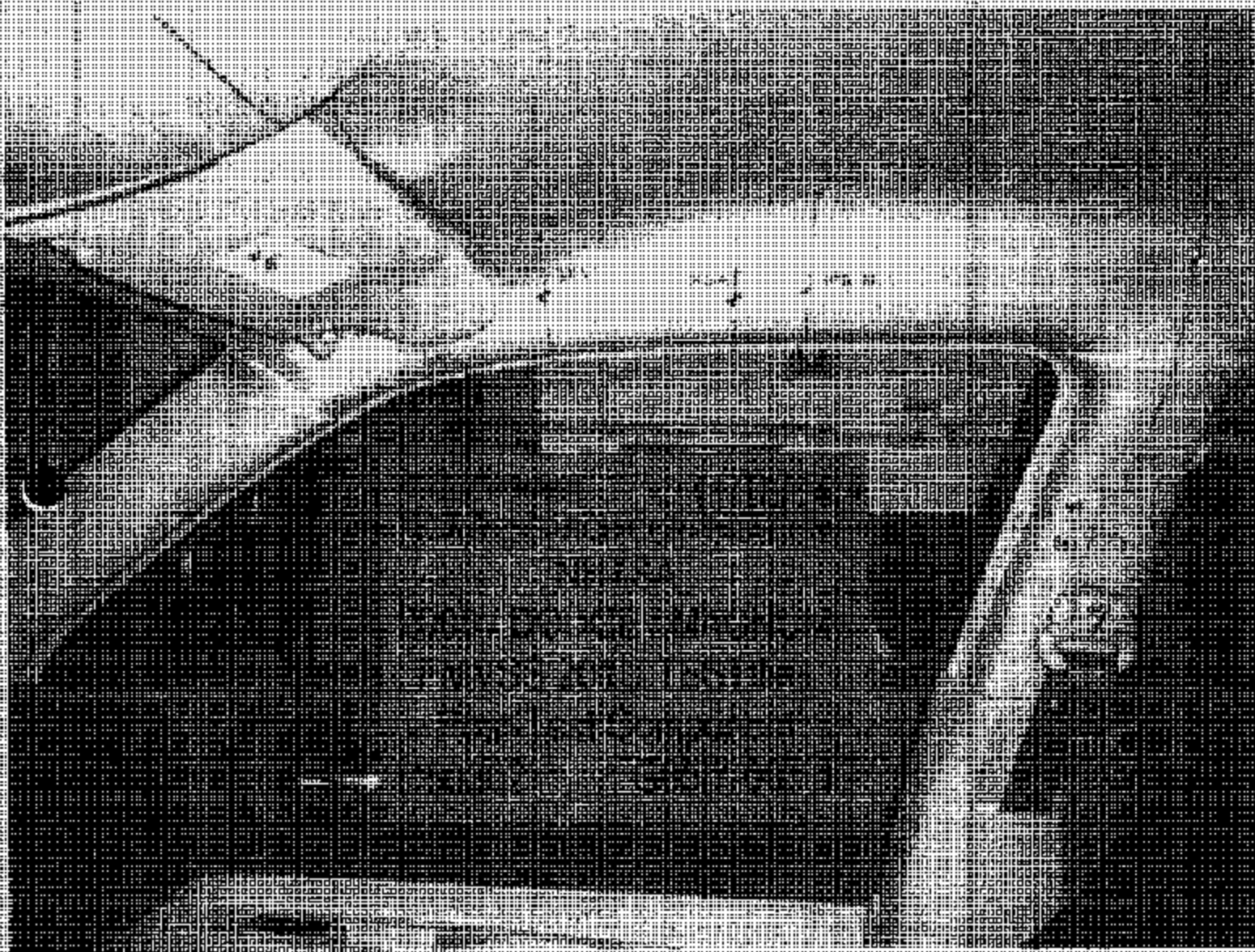


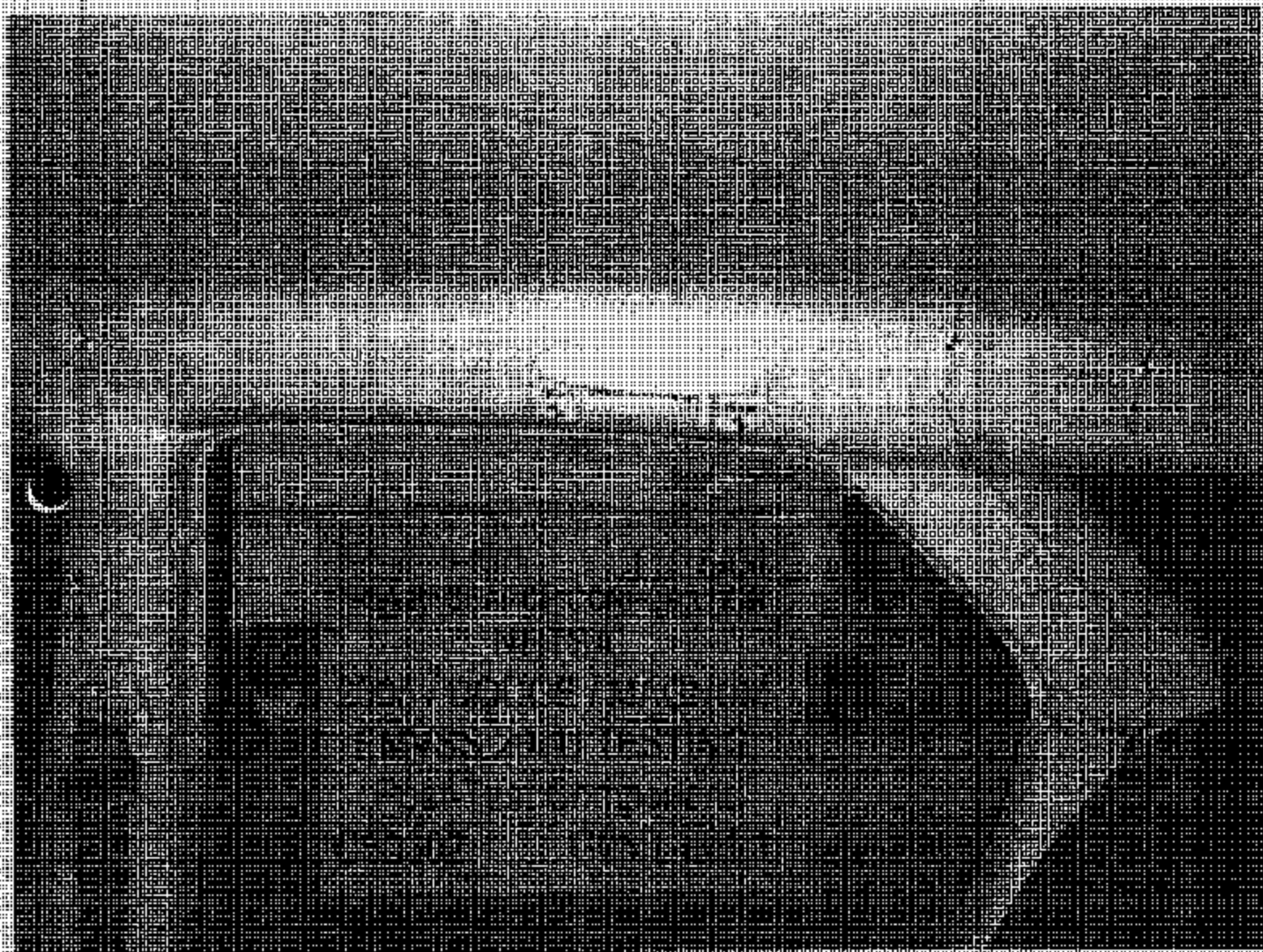




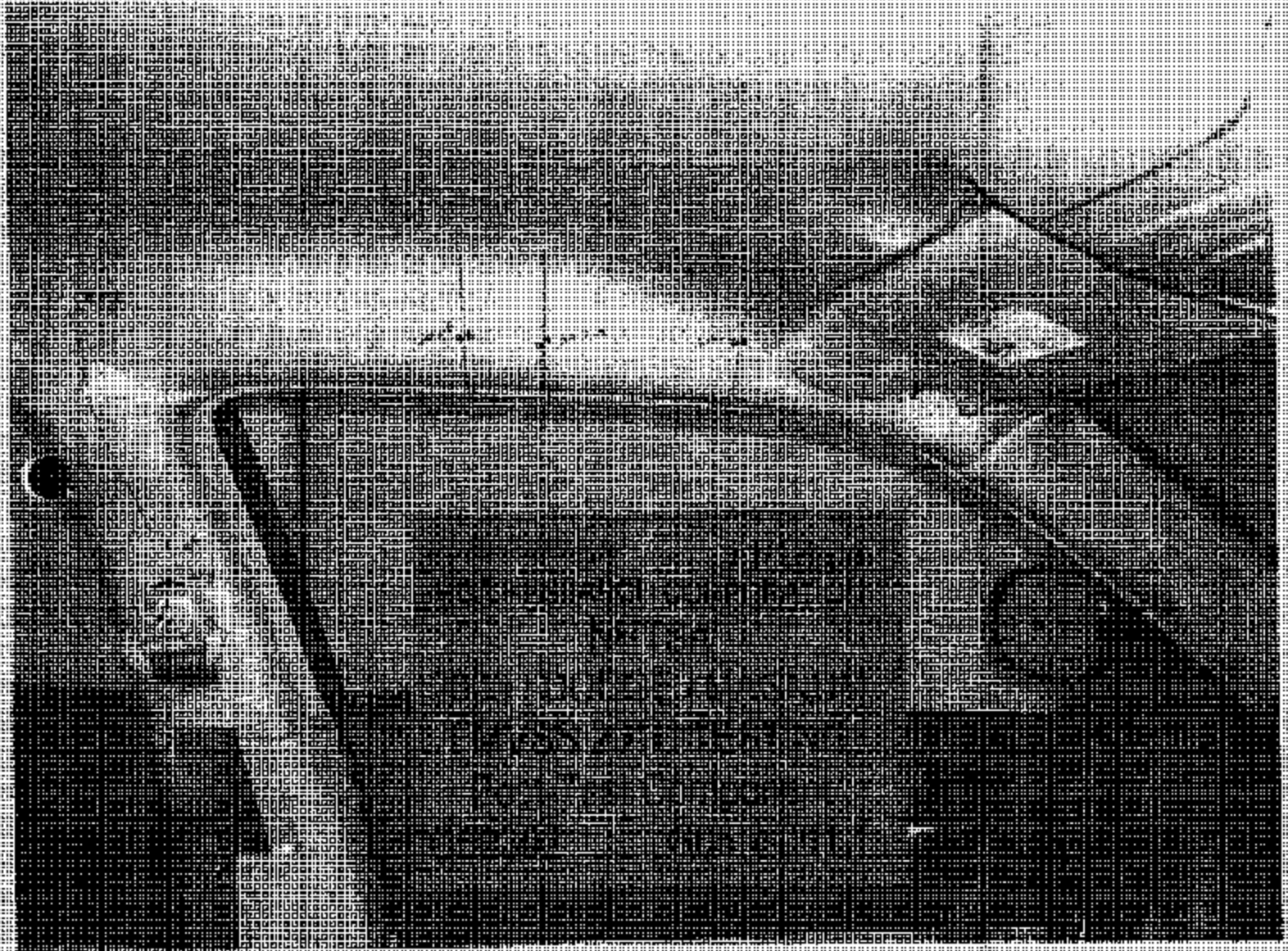


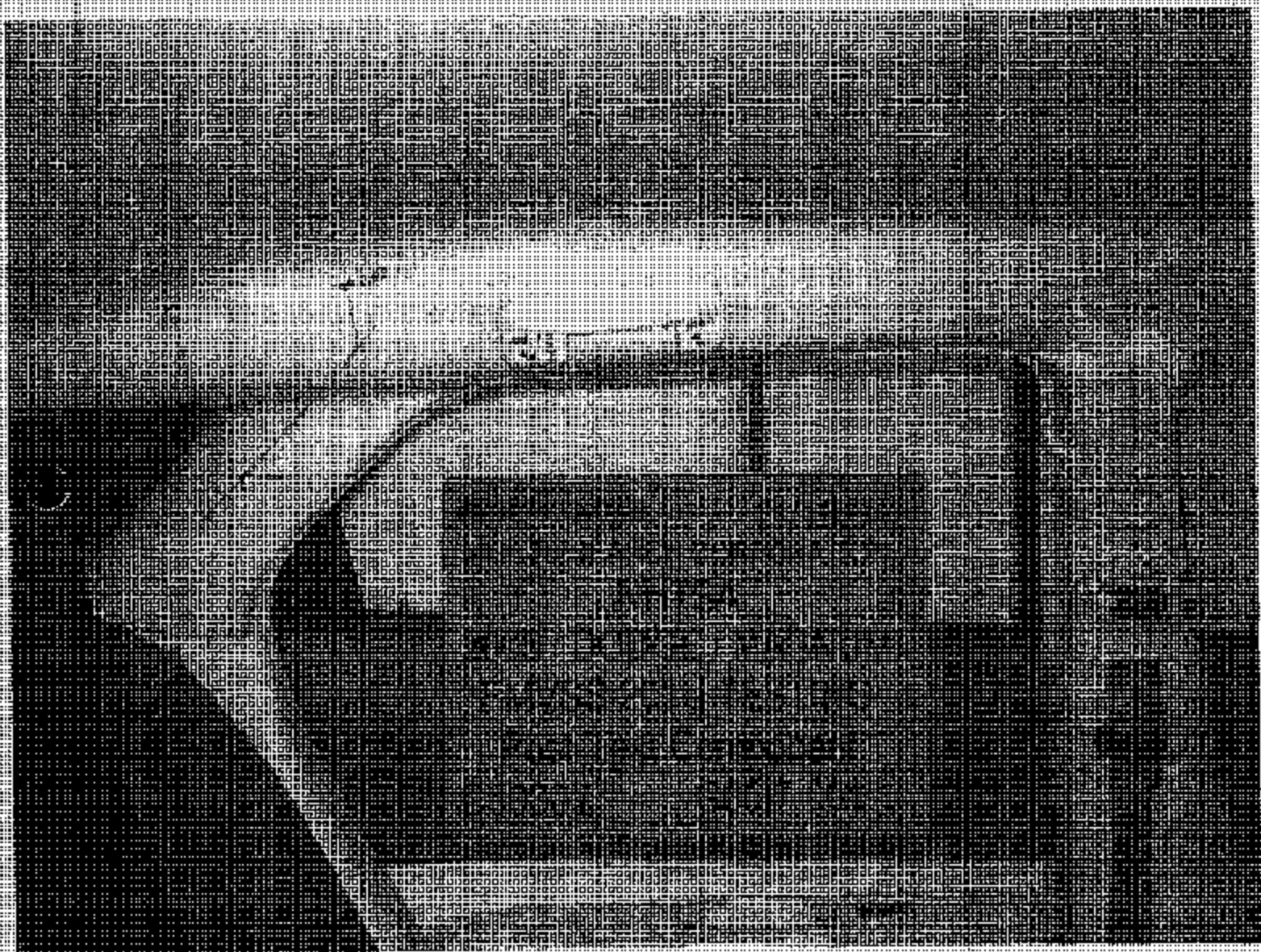




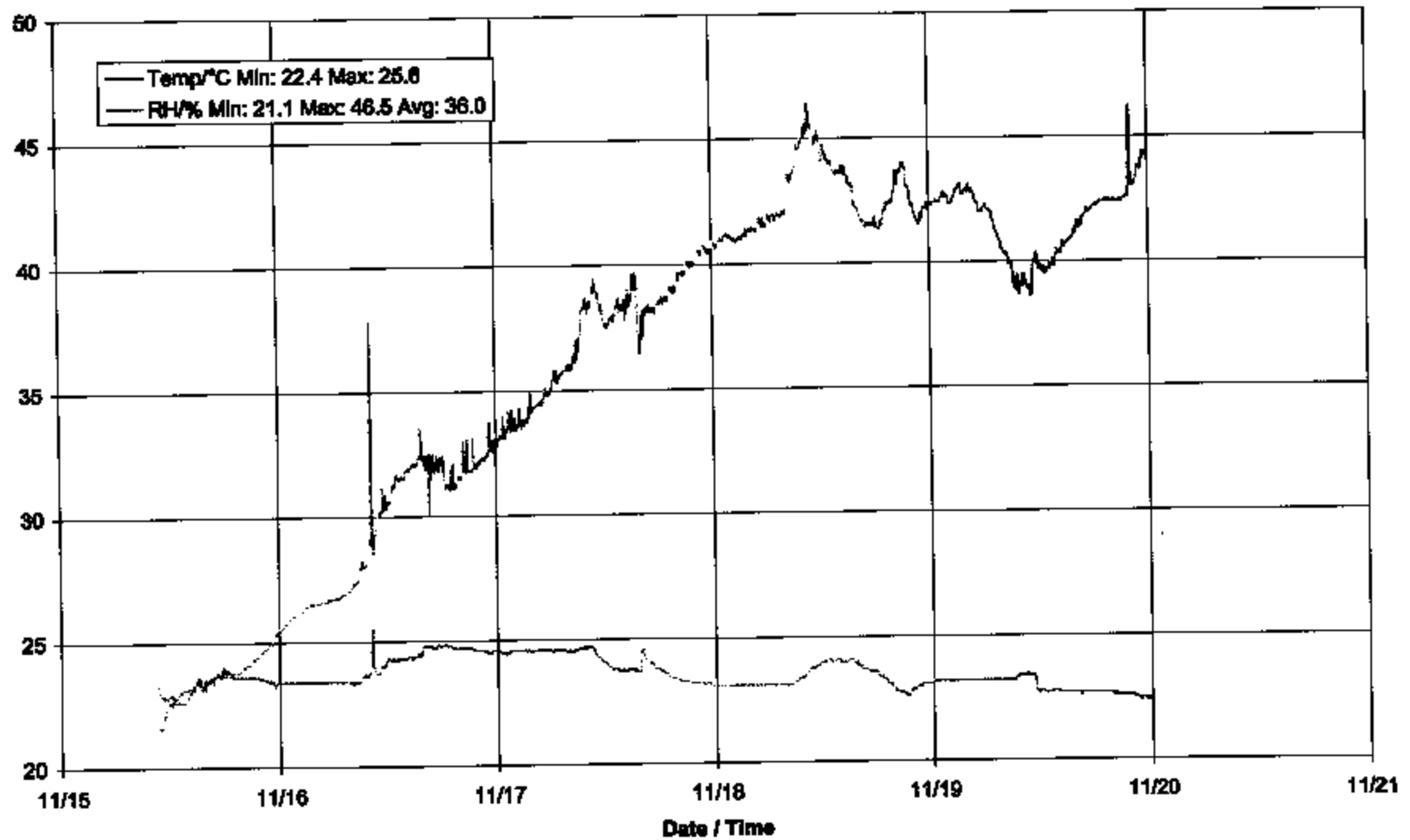








**C50302 2005 Dodge Magnum FMVSS 201U
Nov. 15-19 2004 Temperature Trace**



**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: Reference Accelerometer
Model: 7264-2000	Model: 301M09/484B
S/N: J35924	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: Chris Vega/PCB Piezotronics, Inc.

Test Reference Number: A0424

New DLR (100k, Units: G): 94.1

StdDeviation (%): 0.247

% Difference in DLR (New vs. Old): 1.899

Temperature (°F): 72

Humidity (%): 35

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.6\%$. All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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248 / 577-5001 • fax 248 / 577-5025

www.mgaresearch.com



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: Reference Accelerometer
Model: 7264-2000	Model: 301M09/484B
S/N: J35919	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: Chris Vega/PCB Piezotronics, Inc.

Test Reference Number: A0424

New DLR (100k, Units: G): 94.3

StdDeviation (%): 0.198

% Difference in DLR (New vs. Old): 0.447

Temperature (°F): 72

Humidity (%): 35

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J22664	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 11/9/04	Calibration Date: <i>5/11/04</i>
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0424

New DLR (100k , Units: G): 92.7

StdDeviation (%): 0.495

% Difference in DLR (New vs. Old): 0.224

Temperature (°F): 72

Humidity (%): 35

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35916	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0424**New DLR (100k , Units: G):** 99.6**StdDeviation (%):** 0.348**% Difference in DLR (New vs. Old):** -0.518**Temperature (°F):** 72**Humidity (%):** 35**Performed By:****Approved By:**

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties
expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35918	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0424

New DLR (100k, Units: G): 98.1

StdDeviation (%): 0.137

% Difference in DLR (New vs. Old): 0.16

Temperature (°F): 72

Humidity (%): 35

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties
expressed at approximately the 95% confidence level using a coverage factor k=2.



mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35923	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0424

New DLR (100k , Units: G): 99.8

StdDeviation (%): 0.115

% Difference in DLR (New vs. Old): -1.016

Temperature (°F): 72

Humidity (%): 35

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: Reference Accelerometer
Model: 7264-2000	Model: 301M09/484B
S/N: J36197	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: Chris Vega/PCB Piezotronics, Inc.

Test Reference Number: A0423

New DLR (100k , Units: G): 110.0

StdDeviation (%) 0.117

% Difference in DLR (New vs. Old): 1.822

Temperature (°F): 72

Humidity (%): 32

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 0.3\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: <i>301M09/484B</i>
S/N: J36193	S/N: <i>862/247</i>
Capacity: 2000 G	Capacity: <i>170 G</i>
Calibration Date: 11/9/04	Calibration Date: <i>5/11/04</i>
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0423

New DLR (100k , Units: G): 101.9

StdDeviation (%) 0.206

% Difference in DLR (New vs. Old): 0.497

Temperature (°F): 72

Humidity (%): 32

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.3\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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mga research corporation

CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: Reference Accelerometer
Model: 7264-2000	Model: 301M09/484B
S/N: J36353	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: Chris Vega/PCB Piezotronics, Inc.

Test Reference Number: A0423

New DLR (100k , Units: G): 96.7

StdDeviation (%) 0.158

% Difference in DLR (New vs. Old): -0.171

Temperature (°F): 72

Humidity (%): 32

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 1.5\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: <i>Reference Accelerometer</i>
Model: 7264-2000	Model: 301M09/484B
S/N: J35800	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: <i>Chris Vega/PCB Piezotronics, Inc.</i>

Test Reference Number: A0422

New DLR (100k , Units: G): 98.4

StdDeviation (%) 0.266

% Difference in DLR (New vs. Old): -0.586

Temperature (°F): 72

Humidity (%): 24

Performed By: Approved By: 

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 3.8\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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CALIBRATION CERTIFICATE

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: Reference Accelerometer
Model: 7264-2000	Model: 301M09/484B
S/N: J35841	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: Chris Vega/PCB Piezotronics, Inc.

Test Reference Number: A0422

New DLR (100k , Units: G): 92.6

StdDeviation (%): 0.092

% Difference in DLR (New vs. Old): -0.35

Temperature (°F): 72

Humidity (%): 24

Performed By:

Approved By:

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 0.5\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor k=2.

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**mga research corporation****CALIBRATION CERTIFICATE**

Sensor Information	Reference Sensor Information
Name: 2000 G Accelerometer	Name: Reference Accelerometer
Model: 7264-2000	Model: 301M09/484B
S/N: J35791	S/N: 862/247
Capacity: 2000 G	Capacity: 170 G
Calibration Date: 11/9/04	Calibration Date: 5/11/04
	Calibrated By: Chris Vega/PCB Piezotronics, Inc.

Test Reference Number: A0422

New DLR (100k, Units: G): 88.8

StdDeviation (%): 0.323

% Difference in DLR (New vs. Old): -0.776

Temperature (°F): 72

Humidity (%): 24

Performed By: Approved By: 

All calibrations are traceable to the National Institute of Standards and Technology. Estimated uncertainty of the measurement is $\pm 0.1\%$.
All certification data and equipment are on file for inspection at your request. Best uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor $k=2$.

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www.mgaresearch.com

MECHANICAL OPERATIONS
DATE: 11/24/03
SUPERVISOR: MCGAHEY

DOC. NO. 4 MCGAHEY
REVISION NO. 4
PAGE 3 OF 3

Tape Measure Calibration Certificate

Reference Steel Rule

Brand: GET
S/N: C/8033
Calibration Date: 11.24.03

Subject Tape Measure

Brand: STANLEY
S/N: 424
Calibration Date: 11.5.04

Reference mm	Subject Tape Measure	Difference	Reference mm	Subject Tape Measure	Difference
0	0	0	450	450	0
25	25	0	475	475	0
50	50	0	500	500	0
75	75	0	525	525	0
100	100	0	550	550	0
125	125	0	575	575	0
150	150	0	600	600	0
175	175	0	625	625	0
200	200	0	650	650	0
225	225	0	675	675	0
250	250	0	700	700	0
275	275	0	725	725	0
300	300	0	750	750	0
325	325	0	775	775	0
350	350	0	800	800	0
375	375	0	825	825	0
400	400	0	850	850	0
425	425	0	875	875	0

If all differences are ± 1 mm, then the tape measure is acceptable.

Pass X Fail Maximum Difference = 0

Date: 11.5.04

Performed By: RJMH



Certificate Number: 20040201 Cal

Detroit Testing Laboratory, Inc.



Certificate No. 20.25

7711 E. 17 Mile Road, Warren, MI 48090-4208 • (586) 754-0200 • FAX (586) 754-0045 • www.dtl-lab.com

Certificate of Calibration

Equipment Information

Customer:	MGA Research Corporation 446 Executive Drive Troy, MI 48063	Model:	Fro 360
		Serial Number:	NONE
		Manufacturer:	Milwaukee
System ID:	MGA00069	Description:	Protractor
Customer Asset No.:	MGA00069 (012904)		

Calibration Information

Calibration Date:	1/29/04	Procedure Used:	33K6-4-1597-1/99
Calibration Due:	1/29/05	Calibrated to:	NFR SPBC
Calibration Interval:	12 Month		
Revised In Test:	No/Fail	Temperature:	20 °C
Returned In Test:	Yes/Pass	Humidity:	28 %RH
Performed On Site:	No		
Calibration Limit Spec:			

The Uncertainty of the Measurements Pertaining to This Calibration are Estimated to be: Various

¹ Pass/Fail or In/Out of Tolerance statements are opinions only of the person performing the calibration based on data from measurements at the time they were made, procedure utilized, professional experience, and the uncertainty associated with this calibration. It is ultimately up to the user of this equipment to determine if this level meets their specific requirements for accuracy for its intended application.

Calibration Standards Used

System ID:	Model:	Serial:	Manufacturer:	Description:	Date Recd:
02098	CT481B	61201054	Omega	Thermocouple/Graph	7/28/04
07748	2 X 2"	13928	TRU-STONE	Gauge Surface Plate	2/19/04
10493	SP-66-S1	9902	Schubert Tool, Inc.	Slit Plate	2/17/06
09156	CHALLENGER S1 P 09156		AA JANSSEN	Gage Blocks	3/5/04

Any calibration issued and due date of this device, if issued, is at the request of the customer. Due to the fact that many variables may affect drift of repeated values over time there is no assurance implied that this item will maintain its stated accuracy through the end of this interval.

This Calibration has been performed per requirements of ISO 17025-2002. Reported results are from standards with accuracies that are traceable to the International System of Units (SI), derived from physical constants, and measurements, national measurement standards, or compared to consensus standards. Measurement uncertainty is expressed as a confidence level of approximately 95% (coverage factor k=2).

Signature: <i>Paul Wenzel</i> Paul Wenzel Technician	Date: 1-29-04	Signature: <i>Robert White</i> Robert White Date: 1/29/04
Date Printed: 01/29/04	Printed By: Paul Wenzel	Page 1 of 2

Detroit Testing Laboratory, Inc. hereby agrees, certifies, and assumes the full responsibility for the accuracy of the results reported herein and shall not be responsible, except in full, unless the values reported of the Laboratory. Our intent, opinion, and certificate apply only to those items tested. The use of the name Detroit Testing Laboratory, Inc. or its logo or insignia, are not permitted to be used by any customer on their construction, trademark, advertising, signage or other means of media, without prior written approval.

Form: F410/12-3 Revision Date 03-11-03
 Revision Level: E
 STANDARD FORM

20950 Boering St.
 Southfield MI 48075
 Phone (248) 358-0500 Fax (248) 355-2529

Sterling Scale Company Inc. Scale Certificate of Calibration

Customer: MGA Research

Location of Calibration: 446 E. 14th St.
Troy MI 48065

Certification Number: 6774

Date of Calibration: 8-11-2004

**Next Calibration Due: 8-2005

Environmental Condition: Good Fair Poor

Make:	Model:	Serial/ID#:	Capacity:
<u>S.W. Scales</u>	<u>SW Deluxe</u>	<u>26032389</u>	<u>0800x14</u>

This certifies that the above scale has been calibrated using the relevant EPO, original equipment manufacturer calibration procedures along with Handbook 44 tolerances using weights traceable to the National Institute of Standards and Technology as well as the International System of Units (SI).

Sterling Scale Weight/Weight kit serial #: 1160, 10002, 50967, 20600, 2015, 20130

Calibrated to class: III

Date Weight/Weight kit calibrated: 9/03

Date Weight/Weight kit due: 9/05

Expanded Uncertainty ($k=2$) confidence level of 95% is reported with the before and after readings on next page.

Temperature 72° Humidity 60%

Page 1 of 3

These items relate only to these results

Tolerances followed are maintenance/acceptance per NIST-44

This report shall not be reproduced, except in full, without written approval of the laboratory.

** Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired.

The reported uncertainty is valid only for the environment in which it is determined.



1448.01

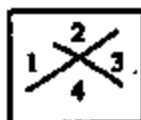
Form N410/12-3 Revision Date 03-11-03
 Revision Level E
 STANDARD FORM

20950 Booming St.
 Southfield MI 48075
 Phone (248) 338-0390 Fax (248) 338-0399

Sterling Scale Company Inc.
Scale Certificate of Calibration

Applied Test Weight	Before Adjustment	Tolerance +/-	In tolerance Y / N	After Adjustment	In tolerance Y / N	Expanded uncertainty
50 lb	50 lb	1 lb	Y	50 lb	Y	-0.0318
1000 lb	1000 lb	2 lb	Y	1000 lb	Y	-0.048
2200 lb	2200 lb	2 lb	Y	2200 lb	Y	-13
50 lb	50 lb	1 lb	Y	50 lb	Y	-0.03
1000 lb	1000 lb	2 lb	Y	1000 lb	Y	-0.6
2200 lb	2200 lb	2 lb	Y	2200 lb	Y	-13

Shift test.



N/A - Small lot

	1	2	3	4
Before Adj.				
After Adj.				

Scale condition as found: Good

Tests performed: ☒ Repeatability ☒ Linearity ☐ Sensitivity ☒ Discrimination

☒ Scale Certified

☐ Scale Rejected

If scale is rejected, why?

Larry / Gary
 Sterling Scale Service Rep.

Date: 8-12-04

at 2-1-3

These items relate only to these results.

This report shall not be reproduced, except in full, without written approval of the laboratory.

Tolerances followed are maintenance/acceptance per NIST-44

** Any number of factors may cause the calibration line to drift out of calibration before the recommended interval has expired.



1448.01

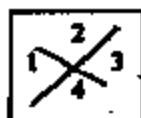
Form F410/12-3 Revision Date 03-11-03
 Revision Level B
 STANDARD FORM

20950 Boening St.
 Southfield MI 48075
 Phone (248) 358-0590 Fax (248) 358-0590

Sterling Scale Company Inc.
Scale Certificate of Calibration

Applied Test Weight	Before Adjustment	Tolerance H -	In tolerance Y / N	After Adjustment	In tolerance Y / N	Expanded uncertainty
50 lb	50 lb	1 lb	Y	50 lb	Y	.003
1000 lb	1000 lb	2 lb	Y	1000 lb	Y	.06
2200 lb	2200 lb	2 lb	Y	2200 lb	Y	.13
50 lb	50 lb	1 lb	Y	50 lb	Y	.003
1000 lb	1000 lb	2 lb	Y	1000 lb	Y	.06
2200 lb	2200 lb	2 lb	Y	2200 lb	Y	.13

Shift test:



N/A - Small pad

	1	2	3	4
Before Adj				
After Adj				

Scale condition as found: New

Tests performed: ☒ Repeatability ☒ Linearity ☐ Sensitivity ☒ Discrimination

☒ Scale Certified

☐ Scale Rejected

If scale is rejected, why?

Larry / Larry
 Sterling Scale Service Rep.

Date 8-11-04

re 323

These lines relate only to these results.

This report shall not be reproduced, except in full, without written approval of the laboratory.

Tolerances followed are maintenance/acceptance per NIST-44

** Any number of factors may cause the calibration line to drift out of calibration before the recommended interval has expired.



1448.01



Certificate Number: 20040729Cal

Detroit Testing Laboratory, Inc.



7111 E. 11 Mile Road, Warren, MI 48092-3708 • (586) 754-8000 • FAX (586) 754-8048 • www.dtl-inc.com

Certificate of Calibration

Equipment Information

Customer:	MGA Research Corporation 446 Executive Drive Troy, MI 48063	Model:	AP 20
		Serial Number:	E33603-0213
		Manufacturer:	Ducommun
System ID:	MGA00081	Description:	Scale
Customer Asset No.:			

Calibration Information

Calibration Date:	3/24/04	Procedure Used:	33K6-4-72-1/98
Calibration Time:	3/24/05	Calibrated to:	MFR SFEC
Calibration Interval:	12 Month		
Revd in Tol:	Yes/Pass	Temperature:	24 °C
Returned in Tol:	Yes/Pass	Humidity:	37 %RH
Performed On Site:	No		

Calibration Limitation:

The Uncertainty of the Measurements Pertaining to This Calibration are Estimated to be: $(0.006 + 0.01\% \text{ Ind}) \text{ lb}$

Pass/Fail or In/Out of Tolerance statements are opinions only of the person performing the calibration based on data from measurements at the time they were made, procedure utilized, professional experience, and the uncertainty associated with this calibration. It is ultimately up to the user of this equipment to determine if this item meets their specific requirements for accuracy for its intended application.

Calibration Standards Used

System ID:	Model:	Serial:	Manufacturer:	Description:	Date Due:
09126	CT485B	61201050	OMEGA	Thermohm/digraph	5/12/04
07580	CLASS C	07580	TRUEMINER	WEIGHT SET	9/11/04

Any calibration interval and due date of this device, if stated, is at the request of the customer. Due to the fact that many variables may affect drift of reported values over time there is no assurance implied that this item will maintain its stated accuracy through the end of this interval.

This Calibration has been performed per requirements of ISO 17025:1999. Reported results are from standards with accuracies that are traceable to the International System of Units (SI), derived from physical constants, ratio measurements, national measurement standards, or compared to consensus standards. Measurement uncertainty is expressed as a confidence level of approximately 95% (coverage factor: 1.96).

Signature: <u>[Signature]</u>	Date: <u>3-24-04</u>	Approved: <u>[Signature]</u>	Date: <u>3-24-04</u>
Jerry Wells	Technician		

Date Printed: 03/24/04 Printed By: Jerry Wells Page: 1 of 2 QPC 1046-1 Rev 4/17/03

Detroit Testing Laboratory, Inc. does not accept, purchase, and does not use the calibration of our customers to whom they were sold until such time as they are returned, except as noted, without the written approval of the Laboratory. Our loans, repairs, and certificates apply only to those items noted. The use of the name Detroit Testing Laboratory, Inc. in its full or partial, or any possible use by the customer on their communications, brochures, advertising, reports or other forms of media, without prior written approval.

~Certificate of Calibration~

Model Number: 484B	N.I.S.T. Project #: 8720012
Serial Number: 2470	Calibration Date: 05/11/2004
Description: Signal Conditioner	Recalibration Date:
Test Procedure: AT-106-1	Calibration Technician: Chris Vega CV. ⁴⁵⁶
Temperature: 74° F	Relative Humidity: 43%

<u>TESTS</u>	<u>BEFORE</u>	<u>AFTER</u>
INPUT VOLTAGE ($24 \pm 0.1V$)	24.02	24.02
ICP CURRENT ($4 \pm 0.6mA$)	3.97	3.97
DC OFFSET A.C. MODE (volts)	-0.01	-0.01
GAIN (REF 1 VRMS, 1kHz)	1.0000	NOT ADJUSTABLE
DRIFT (DC MODE)	< 2mV/min.	NOT ADJUSTABLE
FREQUENCY RESPONSE 10 V _{p-p} , 1 kHz REFERENCE	FLAT TO 200kHz	NOT ADJUSTABLE

As Received: In tolerance

As Left: In tolerance

Special Notes: MGA Research

This document certifies that the equipment referenced above meets published specifications. The calibration procedure is in compliance with ISO 10015-1, and former MIL-STD-45662A and is traceable to NIST. *Measurement Uncertainty (95% confidence level with coverage factor of 2) for scale factors is $\pm 0.2\%$.

This certificate may not be reproduced, except in full, without written approval of

~ Calibration Certificate ~

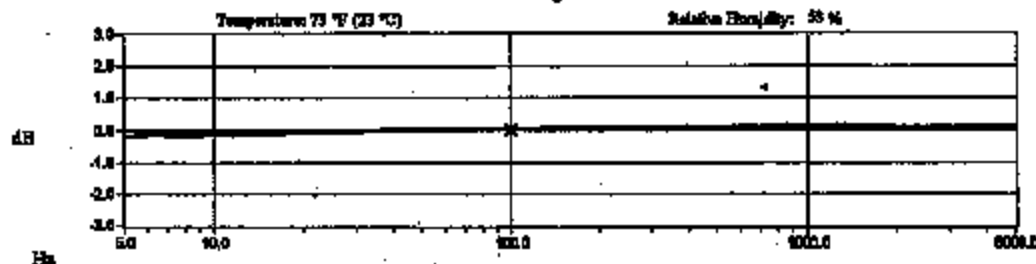
Per-NEC 10203-21

Model Number: 3011M9/4848 (334M17 SYSTEM)Serial Number: 862/2470Description: KCP® AccelerometerMethod: Back-to-Back Comparison CalibrationManufacturer: PCB

Calibration Data

Sensitivity @ 100.0 Hz **31.17 mV/g** Output Bias **0.6 VDC**
 (3.179 mV/ms²) Transverse Sensitivity **3.0 %**

Sensitivity



Data Points

Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)	Frequency (Hz)	Dev. (%)
5.0	-2.3	REF. FREQ.	0.0	5000.0	1.1
10.0	-1.9	300.0	0.7		
15.0	-1.4	500.0	0.8		
30.0	-0.6	1000.0	1.0		
50.0	-0.2	3000.0	1.1		

Identify Indent: Indentation/Reference Stressing Status: Excellent Verbal

Acceptance Level (g): 1.0 g (10.1 m/s²)

The acceptance level may be modified by other agreement of the customer. If the stated level cannot be obtained, the tolerance upper and lower limits shall be at the tolerance limits. Acceptance Level (g)=0.01g

The production control used for calibration by the calibration system is: 1 g = 9.80665 m/s²

Condition of Unit

As Found: In Tolerance. No Adjustment NecessaryAs Left: In Tolerance

Notes

1. Calibration is NIST Traceable thru Project 822/267400 and PTB Traceable thru Project 1055.
2. This certificate shall not be reproduced, except in full, without written approval from PCB Piezotronics, Inc.
3. Calibration is performed in compliance with ISO 9001, ISO 10012-1, ANSI/NCCL Z340-1-1994 and ISO 17025.
4. See Manufacturer's Specification Sheet for a detailed listing of performance specifications.
5. Measurement uncertainty (95% confidence level with coverage factor of 2) for frequency ranges tested during calibration are as follows: 5-9 Hz; +/- 2.0%, 10-99 Hz; +/- 1.5%, 100-1999 Hz; +/- 1.0%, 2-10 kHz; +/- 2.5%.

Technician: Chuck DiMaggio C-12Date: 05/13/04

Cert No 156248

PCB PIEZOTRONICS™

VIBRATION DIVISION

3485 Walden Avenue Depew, NY 14043

TEL: 716-684-0013 FAX: 716-683-3886 www.pcb.com

PAGE 1 of 1

04-100000-01

Certificate of Instrument Calibration and Testing

Customer Information

Dickson Model Number: 78338

Serial Number: 64016409

Calibration Due Date: 11/20/1981

Calibration Date: 11/20/1981

Calibration Results

Pressure Range: 0 to 100 PSI
Accuracy: $\pm 0.5\%$
Temperature Range: 0 to 100°F
Accuracy: $\pm 0.5\%$
Flow Range: 0 to 100 GPM
Accuracy: $\pm 0.5\%$
The following values are typical for this instrument.

Calibration Procedures P112

The instrument is calibrated in accordance with the National Institute of Standards and Technology (NIST) procedures. The instrument is calibrated in accordance with the National Institute of Standards and Technology (NIST) procedures. The instrument is calibrated in accordance with the National Institute of Standards and Technology (NIST) procedures.

Environmental Conditions

Calibration Conditions	Instrument Conditions	Test Conditions
Pressure (PSI)	Pressure (PSI)	Pressure
0 to 100	0 to 100	0 to 100
0 to 100	0 to 100	0 to 100
0 to 100	0 to 100	0 to 100
Temperature (°F)	Temperature (°F)	Temperature
0 to 100	0 to 100	0 to 100
0 to 100	0 to 100	0 to 100
0 to 100	0 to 100	0 to 100

The NIST procedures are used for the calibration of this instrument. The instrument is calibrated in accordance with the National Institute of Standards and Technology (NIST) procedures.

FOR YOUR NEXT CALIBRATION NO PHONE CALLS REQUIRED

Fill out and mail this form today. Your next calibration is scheduled. There is no need to call Dickson Calibration Services.

1. Purchase Order

Name: _____

Phone: _____

Model #: 78338

Serial #: 64016409

2. I-Point Calibration \$149.00

- ☐ 3-Point Calibration \$299.00
- ☐ 5-Point Calibration \$449.00 (with 10-point test)
- ☐ 10-Point Calibration \$699.00 (with 10-point test)
- ☐ 10-Point Calibration \$699.00 (with 10-point test)
- ☐ 10-Point Calibration \$699.00 (with 10-point test)

3. Check Payment

Order now and receive your instrument today.

☐ 6 Red Face

☐ 1 Red Face

☐ Check (50 per 100)

Please fill in the blank spaces for a better price quote. We will be glad to help you.

Give us "exact" and we will be glad to help you.

Please use this form.

Let Dickson Calibration Services be your next calibration. We will be glad to help you.

Dickson Calibration Services